

Studies on some South African Oppiidae Grandjean, 1953 (Acarina: Oribatei)

by

D. J. KOK

Department of Zoology, University of O.F.S., Bloemfontein.

The oribatid fauna of the Republic of South Africa is relatively unknown, and the only systematic papers on this group have been published by Berlese (1924), Trägårdh (1932), Jacot (1940), Sellnick (1957), van Pletzen (1963, 1963a, 1965), Els (1965) and Balogh & Mahunka (1966). The Oribatei of the rest of Africa have been investigated by Grandjean (1934, 1934a), Evans (1953), Balogh (1958, 1959a, 1961a, 1961b), Wallwork (1961a, 1961b) and others.

The present investigation of the family Oppiidae is the first to be done on this group in the Republic of South Africa, and has been carried out on material obtained from the Orange Free State. New species are described in the genera *Amerioppia* Hammer, 1961, *Brachioppia* Hammer, 1961 and *Oppia* C. L. Koch, 1936. One new subspecies is described in the genus *Oppia* and known species of the genera *Multioppia* Hammer, 1961, *Oppia* and *Oppiella* Jacot, 1937 are recorded. All type specimens on which descriptions of new species are based, are kept in the collection of the Department of Zoology, University of the Orange Free State, Bloemfontein, Republic of South Africa.

Genus *AMERIOPPIA* Hammer, 1961

Type-species: *Amerioppia rudentigera* Hammer, 1961

Hammer (1961a) established the genus *Amerioppia* with the following important diagnostic features: The interlamellar setae are always absent; the sensilli are clavate to lanceolate; the rostral setae are long, feathered, parallel and inserted far back on the dorsal surface of the rostrum; nine or ten pairs of notogastral setae are present, with setal pair *ta* absent or very small; all legs are long and slender; six pairs of genital setae are inserted on the genital plates. It will be indicated that the latter feature is not valid as a generic characteristic.

The genus *Amerioppia* is a typical oppiid genus and hitherto the following species have been recorded:

1. *Amerioppia* sp. Hammer 1961
2. *Amerioppia chavinensis* Hammer, 1961
3. *Amerioppia chilensis* Hammer, 1961
4. *Amerioppia hexapilis* Hammer, 1961
5. *Amerioppia lanceolata* (Hammer, 1958) (= *Oppia lanceolata* Hammer, 1958)
6. *Amerioppia longiclava* Hammer, 1962
7. *Amerioppia minima* Hammer, 1961
8. *Amerioppia parapilis* Hammer, 1961
9. *Amerioppia pectigera* Hammer, 1961
10. *Amerioppia rotunda* (Hammer, 1958) (= *Oppia rotunda* Hammer, 1958)

11. *Amerioppia rudentigera* Hammer, 1961
12. *Amerioppia trichosa* (Hammer, 1958) (= *Oppia trichosa* Hammer, 1958)
13. *Amerioppia trichosoides* Hammer, 1961

Hammer (1958) described *Oppia longicoma* and *Oppia notata*. Both correspond in detail with the generic diagnosis of *Amerioppia*, and consequently both must be regarded as belonging to that genus:

14. *Amerioppia longicoma* (Hammer, 1958) **comb. nov.** (= *Oppia longicoma* Hammer, 1958)
15. *Amerioppia notata* (Hammer, 1958) **comb. nov.** (= *Oppia notata* Hammer, 1958)

All species mentioned so far were recorded from America, whence the generic name. Species of this genus have, however, also been recorded from Europe and Africa, but were described as species of the genus *Oppia*. Balogh (1961a) described *Oppia meruensis*, from East Africa, the features of which also correspond with the generic diagnosis of *Amerioppia*, with the result that this species too must be inserted in the genus *Amerioppia*:

16. *Amerioppia meruensis* (Balogh, 1961) **comb. nov.** (= *Oppia meruensis* Balogh, 1961)

Balogh (1959a) also described *Oppia deficiens* from the Congo. Notwithstanding the fact that it has only five pairs of genital setae, all its features accord exceedingly well with those of *Amerioppia*. In a personal communication Dr Hammer confirmed that some of the *Amerioppia* species recorded by herself also have only five pairs of genital setae. The possession of six pairs of genital setae is thus no longer to be regarded as a generic character:

17. *Amerioppia deficiens* (Balogh, 1959) **comb. nov.** (= *Oppia deficiens* Balogh, 1959).

In transferring *Oppia deficiens* to the genus *Amerioppia*, the problem of the validity of the two known subspecies of *Oppia deficiens* arises. The two subspecies are *Oppia deficiens circumciliata* Balogh, 1959 and *Oppia deficiens lamellata* Wallwork, 1961. The sensilli of these subspecies are clavate to lanceolate, and differ from those of the species in that each sensillar head bears a marginal fringe of fine seta-like processes, a shape that does not exactly correspond to that of the sensilli of *Amerioppia*. In a personal communication Dr. Hammer expressed the opinion that the sensillar shape is a very important generic characteristic. It is difficult to determine the relative importance of morphological features, and as both subspecies morphologically resemble the species very closely, and because the sensillar difference may be regarded as a slight variation only, it is the opinion of the present author that the subspecies must be considered as subspecies of *Amerioppia deficiens*:

18. *Amerioppia deficiens circumciliata* (Balogh, 1959) **comb. nov.** (= *Oppia deficiens circumciliata* Balogh, 1959)
19. *Amerioppia deficiens lamellata* (Wallwork, 1961) **comb. nov.** (= *Oppia deficiens lamellata* Wallwork, 1961)

The genus *Amerioppia* is represented in the Orange Free State by a new species:

Amerioppia africana spec. nov., figs. 1-4

Holotype: One specimen from plant material collected by Professor R. van Pletzen in a poplar grove on a farm in the district of Bloemfontein on 16/4/59. Type locality 1. **Paratypes:** Numerous specimens throughout the Orange Free State.

Colour: Brown.

Dimensional range: Total length 320–352 μ ; Width of the hysterosoma 184–212 μ .

Diagnosis: Interlamellar setae absent; five pairs of genital setae; sensilli clavate to lanceolate and set with very small, nearly invisible bristles; ten pairs of notogastral setae, of which nine pairs are moderately long and setal pair *ta* minute; tarsus II with only one solenidion.

Description of the holotype: *Prodorsum* (fig. 1), about as long as broad, with the rostrum rounded. All prodorsal setae, except the interlamellar setae are present. The rostral setae *ro* are parallel to each other, unilaterally feathered and inserted rather far back on the dorsal surface of the rostrum, at a mutual distance of about 8 μ . The lamellar setae *la* are glabrous and nearly as long as their mutual distance. The interlamellar setae are absent, without even a trace of their alveoli left. The exobothrydial setae *ex* are present and pilose.

A chitinized band is present between the bothrydia on the posterior border of the prodorsum. Two to three pairs of light areas are present in the middle of the prodorsum, between the bothrydia. The posterior pair partly overlaps the chitinized posterior band. These light areas have irregular borders. Two to three pairs of light areas are also present anterior to the bothrydia. The lateral borders of these areas are distinct, but their inner borders are rather indistinct. Laterally to these light areas the prodorsum is more darkly chitinized. The areas between and dorsal to the insertions of legs I, II and III are slightly granulated, with the setae *ex* inserted in these areas.

The sensilli are moderately long and clavate to lanceolate, with their distal tips verly slightly pointed. The sensillar areas are covered with very small bristles, which actually resemble mere spots (cf. fig. 1).

Notogaster (fig. 1) is slightly longer than broad, and has on the anterior border a broad chitinized band. Ten paris of notogastral setae are present. Setae *ta* are short and thin and inserted on the anterior chitinized band of the notogaster, behind the bothrydia. All other notogastral setae are moderately long and very slightly pilose or merely rough. The medial setal pairs *ti* and *ms* are the longest. The setae *r*₁, *r*₂, *r*₃ and *te*, belonging to the lateral series, are of about equal length and a little shorter than the medial series. The setae of the *p*-series are the shortest and appear even more so, because they are curved ventrally. The fissures *im* are distinct and situated anterior to setae *r*₃. The fissures *ia* and *ip* could not be located and may be absent.

Ventral side (fig. 2): Five pairs of genital setae are present. The distance between the genital plates and the anal plates is less than twice the distance of the genital plates. Fissures *iad* are situated parallel and adjacent to the lateral margins of the anal plates. The first pair of epimeres bears three pairs of setae, the second pair only one pair and the fused posterior epimeral pairs 3–4 bear four pairs of setae. The medial parts of the epimeres are slightly reticulated. The seta of tectopedium I is absent but the other tectopedial setae are present. The discidium between legs III and IV forms a sharp process.

Legs (figs. 3 and 4): Solenidion ω_1 of tarsus I is thick and slightly arched anteriorly, with the short famulus ϵ inserted immediately posterior to it. Solenidion ω_2 is very thin and inserted anterior to ω_1 on the antiaxial side.

The possession of only one thick, short and almost straight solenidion ω on the tarsus of leg II is characteristic. Unfortunately it was impossible to study other species of the genus *Amerioppia* in order to determine whether or not the absence of the one tarsal solenidion, is a generic characteristic.

All ventral setae of tarsus III are considerably more pilose than the dorsal setae. On leg IV a' and pu' of the tarsus and v' of the tibia are short and feathered. Tarsus IV is about 107μ in length while tarsi I and III are about 86μ . Tarsus II is the shortest, being about 73μ in length.

General remarks: *Amerioppia africana* bears the greatest resemblance to *Amerioppia deficiens* (Balogh, 1959) but setae p_1 , p_2 and p_3 are considerably longer in the former species. *Amerioppia deficiens* also possesses only five pairs of genital setae. It has already been pointed out that the number of genital setae cannot be used to differentiate between species, as Hammer did not indicate the number of genital setae in the species described by her.

Genus *BRACHIOPPIA* Hammer, 1961

Type-species: *Brachioppia cuscensis* Hammer, 1961

The generic diagnosis given by Hammer (1961a) comprises the following features: The sensillar head is disk-shaped and bears a variable number of radiating branches; all the prodorsal setae are present; the lamellae and translamella are often indicated by the tubercles only; between the lamellar setae and the bothrydia a more or less quadrangular field is demarcated by these lamellar and translamellar traces; the adanal fissures are situated obliquely to and remote from the lateral margins of the anal plates; tibia II has on its inner side a strong, serrated or feathered spine and the tactile hair is short and broad.

The numbers of genital and notogastral setae are not mentioned by Hammer in the generic diagnosis. For the genus *Amerioppia* it has already been pointed out that the number of genital setae is variable within the genus, and it is assumed that this is also the case in the genus *Brachioppia*.

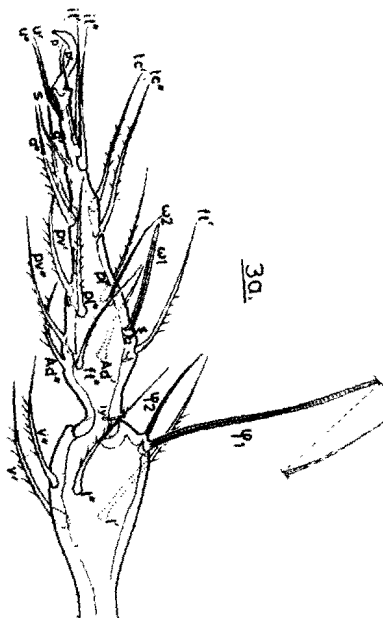
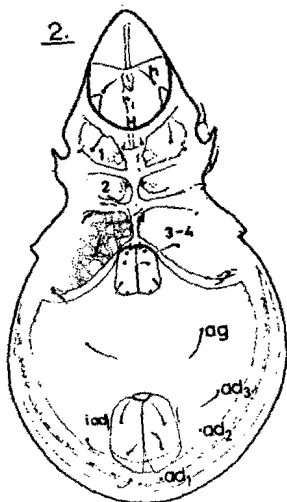
All the hitherto described species of *Brachioppia* have nine pairs of notogastral setae. Only the alveoli of the tenth pair ta are present. Balogh (1961d) used this feature in his identification keys. In one of the new species described as *Brachioppia quathlambae*, the number of notogastral setae was found to be ten. Setae ta are present but very small. The presence of the alveoli of setae ta in the other species of *Brachioppia*, indicates that setae ta have been present during the ontogenetic stages and may still be present in the adult stage, but in a highly reduced state. All the other features of *Brachioppia quathlambae* correspond well with the generic diagnosis.

No detailed figures are given by Hammer of the serrated spine and the short broad tactile hair of tibia II. It was found in all the new species of *Brachioppia* that the solenidion ω_1 of tibia II is always relatively short and the ventral seta v' on the paraxial side or both ventral setae v' and v'' , are stout and spinelike. The shorter solenidion of tibia II is however, not restricted to the genus *Brachioppia*. It was found that this solenidion is relatively short in most other Oppiidae examined.

Since the establishment of the genus, the following species have been described:

1. *Brachioppia cajamarcensis* Hammer, 1961
2. *Brachioppia cuscensis* Hammer, 1961
3. *Brachioppia deliciosa* Hammer, 1961
4. *Brachioppia tenuicoma* (Hammer, 1958) (= *Oppia tenuicoma* Hammer, 1958)

Some of the present species of the genus *Oppia* may also belong to the genus *Brachioppia*, but the transfer of any of these species to the genus *Brachioppia* may only be proved necessary after studying the type material (cf. *Oppia machadoi* Balogh, 1958; *Oppia soror* Balogh, 1958; *Oppia nasalis* Evans, 1953; *Oppia assimillis* Mihelcic, 1956, etc.).



The genus *Brachioppia* is represented in the Orange Free State by five new species:

***Brachioppia longisetosa* spec. nov., figs. 5 and 6**

Holotype: One specimen from decomposing needles of a Cedrus tree. Collected by Professor R. van Pletzen on the farm Helpmekaar in the district of Fouriesburg on 20/12/59. Type locality V. **Paratypes:** Collected at Witsieshoek in moist soil, moss and grass at an altitude of 8,500 ft. above sea level near Mont Aux Sources and at Bloemfontein in compost.

Colour: Light brown.

Dimensional range: Total length 288–320 μ ; width of hysterosoma 184–212 μ .

Diagnosis: Very long interlamellar, lamellar and rostral setae; notogastral setae long, with setal pairs *ms* inserted in the posterior half of the notogaster; very long sensilli with a characteristic shape; six pairs of genital setae.

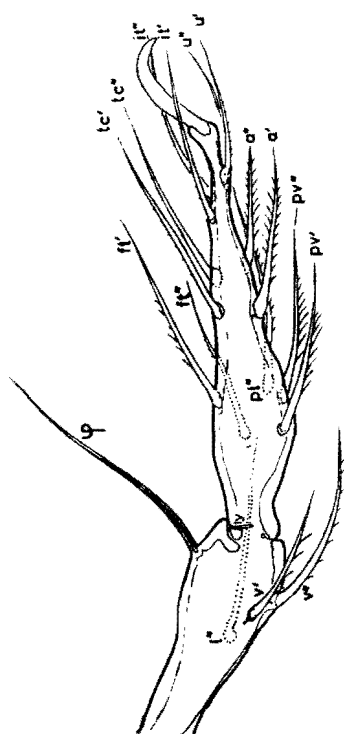
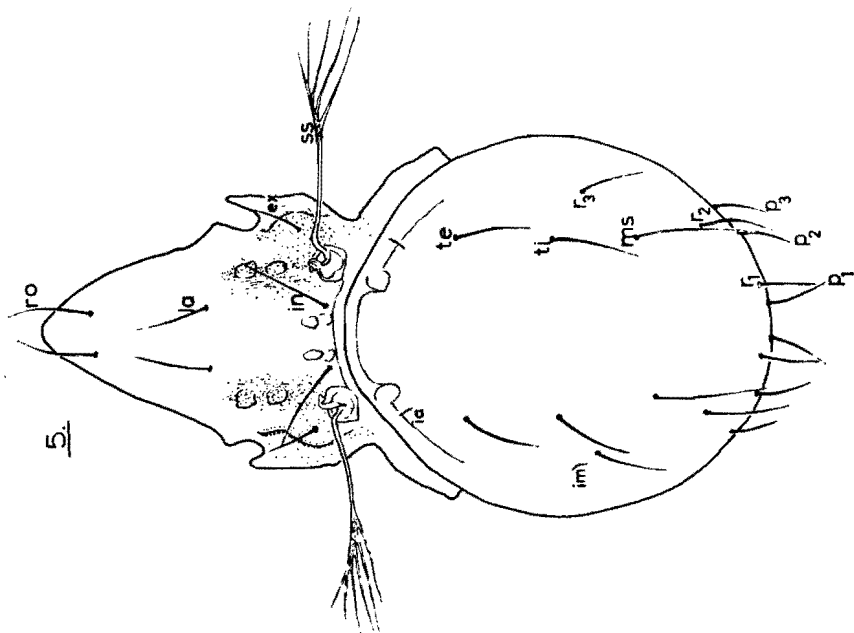
Description of the holotype: *Prodorsum* (fig. 5) is only slightly longer than broad, and the rostrum rounded. All prodorsal setae are present and all are long and glabrous. The rostral setae *ro* are more than twice the length of their mutual distance, the lamellar setae *la* about one and half times as long as their mutual distance and the interlamellar setae *in* nearly twice the length of their mutual distance.

Two pairs of indistinct light areas are situated anterior to the bothrydia. A fine granulation, apparently of the cerotegument, covers the light areas and their vicinities, forming "lamellar traces". These "lamellar traces" together with the chitinized band on the posterior border of the prodorsum, demarcate the posterior and lateral borders of the quadrangular field mentioned in Hammer's diagnosis of the genus. No anterior border of the quadrangular field is visible between the lamellar setae. A further two pairs of light areas are present between the interlamellar setae *in*, in the middle of the posterior part of the quadrangular field. The exobothrydial setae *ex* are inserted on the granulated sides of the prodorsum, laterally to the bothrydia. A chitinous ridge is present laterally to the setae *ex* on each side. The sensilli are long. Each sensillar head is distended very slightly and bears five to six long, thin, radiating branches. The three proximal branches are of about equal length and the distal ones shorter. All branches are inserted on the posterior edge of the sensillar head and point laterally.

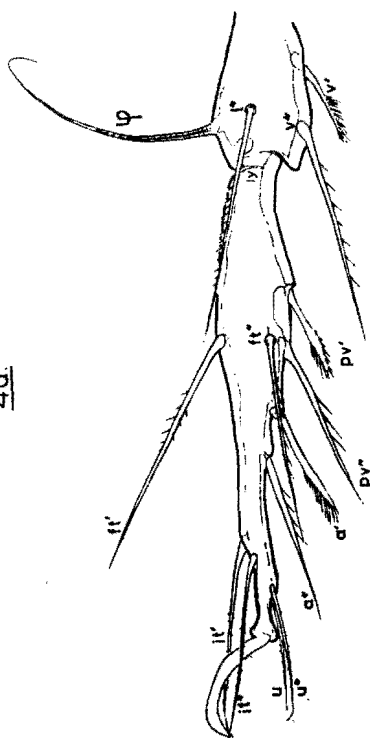
Notogaster (fig. 5) is almost round, and possesses the typical chitinized band anteriorly. This band has two short posteriorly directed processes situated behind the bothrydia. These processes extend backwards and then turn laterally, thus forming almost closed circles.

EXPLANATION OF FIGURES

Figs. 1-3. *Amerioppia africana* spec. nov. 1. Dorsal view and sensillus; 2. Ventral view; 3. Leg podomeres; a. Tibia and tarsus of Leg I, lateral view. b. Tibia and tarsus of leg II, lateral view. *a*: antelateral setae; *Ad*: additional setae; *ft*: fastigial setae; *it*: iteral setae; *l*: lateral setae; *ly*: tarsal lyrifissures; *p*: proral setae; *pl*: primilateral setae; *pv*: primiventral setae; *s*: sub-unguinal seta; *tc*: tectal setae; *u*: unguinal setae; *v*: ventral setae; *w*: tarsal solenidia; *e*: famulus; *fi*: tibial solenidia.



4a.



4b.

Nine pairs of notogastral setae are present, and they are arranged in a somewhat atypical pattern. The setae of the *p*- and *r*-series are inserted in their normal positions. The setae of the *p*-series are curved downwards very slightly. Fissures *im* are situated antero-laterally to setae *r*₃. The medial setal pair *ms* is situated in the posterior part of the notogaster and remote from *r*₃. The setal pair *ti* is inserted in the position usually occupied by *ms*, while pair *te* is inserted directly anterior to *ti*. No traces of setae *ta* or their alveoli could be seen. All the notogastral setae are moderately long. Fissures *ia* and *ip* are distinct, the latter only visible from a posterior ventrolateral view.

Ventral side (fig. 6): Six pairs of setae are inserted on the genital plates which are removed from the anal plates by a distance equal to the length of the latter. The fissures *iad* are situated obliquely to and removed from the lateral margins of the anal plates. Two pairs of setae are present on the first pair of epimeres. The second pair of epimeres bears only one pair of setae, while the fused posterior pairs 3-4 bear the usual four pairs of setae. The epimeres are slightly reticulated medially. All tectopedial setae are present as is also the discidium on each side between legs III and IV.

Legs: There are no marked differences from the general leg chaetotaxy of other species of the Oppiidae.

Setal formulae I: 1-5-2-4-20; II: 1-5-2-4-14; III: 2-3-1-13; IV: 1-2-2-3-10. Solenidion formulae I: 0-1-2-2; II: 0-1-1-2; III: 0-0-1-1-0; IV: 0-0-0-1-0.

On tarsus I the short famulus curves slightly backwards. The solenidion of tibia II is remarkably short, that of genu III is short and that of tibia III markedly short, while the solenidion of tibia IV is very long.

General remarks: The arrangements of the notogastral setae bears the greatest similarity to that of *Oppia manifera* Hammer, 1955. However, the setal pair *ta* is present in *Oppia manifera*. The shape of the sensillar head is different in the two species mentioned above.

In *Oppia soror* Balogh, 1958 the shape of the sensillar head is nearly the same as that of *Brachioppia longisetosa*, but the arrangement and nature of the notogastral setae are different in the two species.

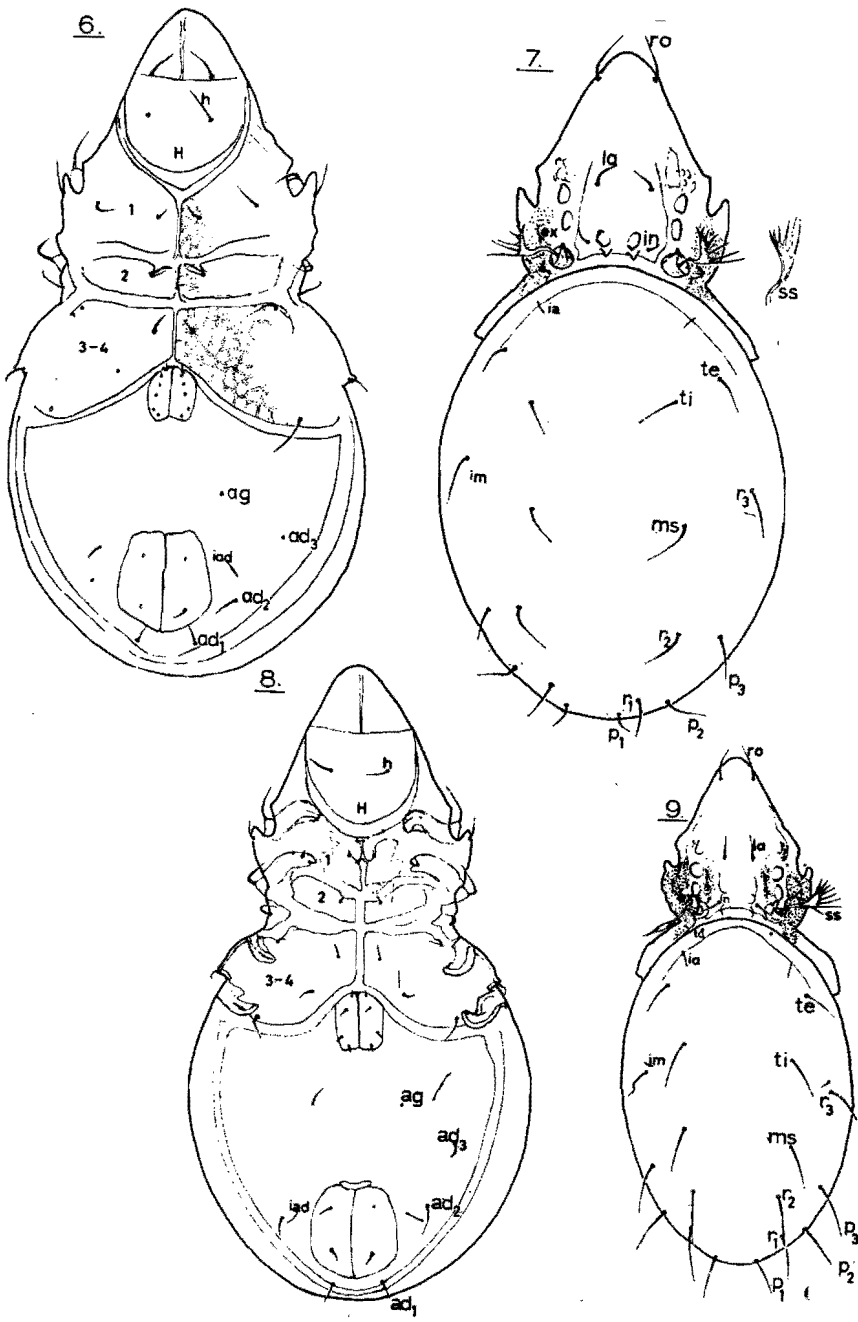
***Brachioppia moresonensis* spec. nov., figs. 7 and 8**

Holotype: One specimen from moist soil under dense tress, inter alia *Olea* sp., *Roicissus* sp., *Grewia* sp., *Gymnosporia* sp., *Halleria lucida*, etc. Collected by the author on the farm Moreson in the district of Winburg on 14/12/63. Type locality 288. *Paratypes*: Collected near Orkney in moist soil and grass near *Acacia* karroo on the Southern bank of the Vaal River and at Oranjeville in moist leaves and soil under *Rhus lancea* trees.

EXPLANATION OF FIGURES

Fig. 4. *Amerioppia africana* spec. nov., leg podomeres. a. Tibia and tarsus of leg III, medial view. b. Tibia and tarsus of leg IV, lateral view. *a*: antelateral setae; *ft*: fastigial setae; *it*: iter lateral setae; *l*: lateral setae; *ly*: lyrifissures; *pl*: primilateral setae; *pv*: primiventral setae; *tc*: tectal setae; *u*: unguinal seta; *v*: ventral setae; Φ : tibial solenidia.

Fig. 5. *Brachioppia longisetosa* spec. nov., dorsal view.



Dimensional range: Total length, 300–344 μ ; Width of hysterosoma, 168–184 μ .

Diagnosis: The position of fissures *im* posterior to setae *r*₃; four pairs of genital setae; the rostral setae inserted far laterally on the rostrum; exobothrydial setae very small.

Description of the holotype: *Prodorsum* (fig. 7) is very nearly as long as broad, and all the prodorsal setae are present. The glabrous rostral setae *ro* are inserted on the lateral sides of the rostrum, with a long mutual distance. The lamellar setae *la* are glabrous and a little shorter than their mutual distance while the interlamellar setae *in* are much shorter than the distance between them.

On the prodorsum a quadrangular field is present, almost similar to that described for *Brachioppia longisetosa*. The lamellar traces forming the lateral borders of the quadrangular field, are darker in colour and more chitinized than in *Brachioppia longisetosa*, and end anterolaterally to the lamellar setae. On each side, anterior to the bothrydia two distinct light areas with three to four smaller ones anterior to them, are present. Between the interlamellar setae two pairs of light areas are present. The posterior of these two pairs partly overlaps the chitinous band between the bothrydia.

The sensilli *ss* are about as long as their mutual distance. Each sensillar head is spindle-shaped and bears from five to seven radiating branches, which gradually become shorter towards the distal end. The distal ends of the sensilli are always directed anteriorly, with the pectinate, radiating branches pointing about 45° upwards. The short, glabrous exobothrydial setae *ex* are inserted on the sides of the prodorsum, in granulated areas laterally and anterolaterally to the bothrydia.

Notogaster (fig. 7): Nine pairs of notogastral setae are present on the oval-shaped hysterosoma. All notogastral setae are glabrous and almost of equal length, being about as long as the rostral setae. The setae of the *p*-series appear shorter than their actual length because they are curved ventrally. Alveolar traces of setal pair *ta* are absent. The position of fissures *im* posterior to setae *r*₃ is characteristic. Fissures *ia* and *ip* are distinct, the latter only visible from a posterior ventrolateral view.

Ventral side (fig. 8): Four pairs of genital setae are present on the genital plates which are removed from the anal plates by a distance more than twice the length of the genital plates. The fissures *iad* are removed from and oblique to the lateral margins of the anal plates. The first pair of epimeres bears two pairs of setae, the second epimeral pair bears one pair of setae and the fused posterior epimeral plates 3–4 bear four pairs of setae. The setae of the epimeres are short. The projecting discidia between legs III and IV are present. All tectopedial setae are present.

Legs: Setal formulae I: 1–5–2–4–20; II: 1–5–3–4–14; III: 2–3–1–3–13; IV: 1–2–2–3–10. Solenidion formulae I: 0–1–2–2; II: 0–1–1–2; III: 0–0–1–1–0; IV: 0–0–0–1–0.

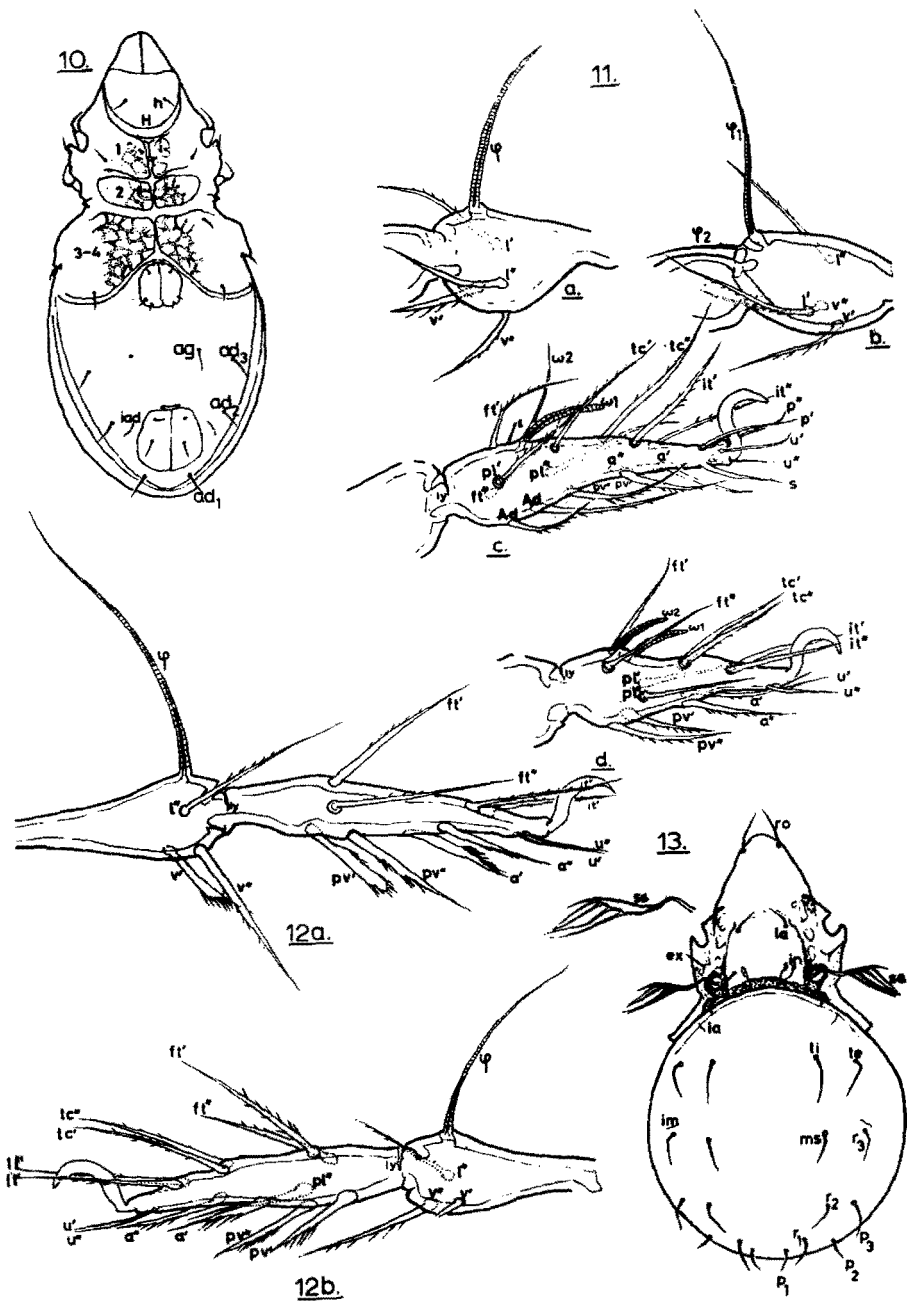
The distal part of the solenidion ω_2 of tarsus I is strongly curved. On tibia II the solenidion is short, while both ventral setae are relatively thick. The solenidion of genu III is short as usual, while that of tibia IV is fairly short. The ventral setae of tibia III and IV are thick. The setae of the third and fourth trochanters are thin.

EXPLANATION OF FIGURES

Fig 6. *Brachioppia longisetosa* spec. nov., ventral view.

Figs. 7–8. *Brachioppia moresonensis* spec. nov. 7. Dorsal view; 8. Ventral view.

Fig. 9. *Brachioppia orkneyensis* spec. nov., dorsal view.



***Brachioppia orkneyensis* spec. nov., figs. 9-12**

Holotype: One specimen from moist soil and grass near *Acacia* karroo trees. Collected by the author near Orkney on the southern bank of the Vaal River on 6/12/63, Type locality 280. **Paratypes:** Collected at Winburg, Arlington, Heilbron, Villiers, Verkykerskop, Bloemfontein and Ladybrand.

Colour: Light brown to brown.

Dimensional range: Total length 330–380 μ ; width of hysterosoma 140–172 μ .

Diagnosis: Nine pairs of notogastral setae and the alveoli of *ta* present; the medial setal pair *ms* inserted far posteriorly; the position of the setal pair *r*³ posterior to the fissures *im*, in contrast with the opposite insertion in *Brachioppia moresonensis*; four pairs of genital setae.

Description of the holotype: *Prodorsum* (fig. 9) is slightly longer than broad, and the rostrum rounded. All prodorsal setae are present and are glabrous. The rostral setae *ro*, inserted on the dorso-lateral sides of the rostrum, are only slightly longer than their mutual distance. The lamellar setae *la* are about as long as, and the interlamellar setae *in* shorter than their mutual distances.

On each side a distinct, nearly C-shaped line is present immediately posterior to the interlamellar setae. These lines partly overlap the chitinous band situated between the bothrydia. The prodorsal quadrangular field, present in the other species of *Brachioppia*, again lacks an anterior border, while the lateral borders are formed by the lamellar traces which end posterolaterally to the lamellar setae. Two pairs of indistinct light areas are present in the quadrangular field. (In some of the specimens other than the holotype, these light areas are fairly distinct.) Anterior to the bothrydia two pairs of distinct light areas and a few smaller, less distinct areas are present.

On each side of the prodorsum a distinct granulation is present in the area between and dorsal to the insertion of legs I, II and III. The exobothrydial setae *ex* are inserted in these areas. A longitudinally disposed chitinous ridge is present dorsally to each exobothrydial seta.

The sensilli are about as long as their mutual distance. Each sensillar head is slightly expanded with seven to eight pectinate, radiating branches. The most anterior or distal branch is the shortest, and is followed by branches of increasing length. The penultimate proximal branch is the longest, and is followed by a very short ultimate proximal branch.

Notogaster (fig. 9) is oval, but more elongated than in the former two species. The nine pairs of notogastral setae are arranged as in fig. 11, with the medial pair *ms* inserted far posteriorly. All the notogastral setae are glabrous and slightly longer than

EXPLANATION OF FIGURES

Figs. 10-12. *Brachioppia orkneyensis* spec. nov. 10. Ventral view; 11. Leg podomeres. a. Tibia II, lateral view. b. Tibia I, medial view. c. Tarsus I, medial view. d. Tarsus II, lateral view. *a*: antelateral setae; *Ad*: additional setae; *ft*: fastigial setae; *it*: iter lateral setae; *l*: lateral setae; *ly*: tarsal lyrifissures; *p*: proral setae; *pl*: primilateral setae; *pv*: primiventral setae; *s*: sub-unguinal seta; *tc*: tectal setae; *u*: unguinal setae; *v*: ventral setae; ω : tarsal solenidia; ϵ : famulus; Φ : tibial solenidia. 12. Leg podomeres. a. Tibia and tarsus of leg IV, lateral view. b. Tibia and tarsus of leg III, medial view. *a*: antelateral setae; *ft*: fastigial setae; *it*: iter lateral setae; *l*: lateral setae; *ly*: lyrifissures; *pl*: primilateral seta; *pv*: primiventral setae; *tc*: tectal setae; *u*: unguinal setae; *v*: ventral setae; Φ : tibial solenidia.

Fig. 13. *Brachioppia pectinata* spec. nov., dorsal view.

those of *Brachioppia moresonensis*. Especially the posterior setae p_1 , p_2 and r_1 are markedly longer than the corresponding setae in *Brachioppia moresonensis* and are furthermore straight instead of curved. The fissures *im* are situated anterior to setae r_3 . The alveoli of the setal pair *ta* are present on the anterior chitinous band of the notogaster, and posterolaterally to them fissures *ia* are situated. The fissures *ip* are also distinct but only visible from a posterior ventrolateral view.

Ventral side (fig. 10): The distance between the anal and genital plates is more than twice the length of the genital plates. Fissures *iad* are situated obliquely to and removed from the lateral margins of the anal field. Four pairs of genital setae are present. The anterior epimeral pair bears two pairs of setae, the second pair has only one pair and the fused posterior pairs 3-4 bear four pairs of setae. All tectopedial setae are present. The discidia between legs III and IV are blunt.

Legs (figs. 11 and 12): Of all the species of *Brachioppia* only the legs of *Brachioppia orkneyensis* have been figured. Due to the very slight differences found in the leg chaetotaxy of the different species of *Brachioppia*, it has been considered unnecessary to supply figures of the leg setae of all species in detail. *Brachioppia orkneyensis* has been chosen at random.

Leg I (fig. 11b and c): Setal formula—1-5-2-4-20; solenidion formula—0-1-2-2. Of the two solenidia on the tibia, ϕ_1 is more than twice the length of ϕ_2 . The subunguinal seta *s* of the tarsus, is eupathidial. The famulus *e*, posterior to the thick, arched solenidion ω_1 , has apparently a very slightly distended tip. Solenidion ω_2 is thin and slightly longer than ω_1 .

Leg II (fig. 11a and d): Setal formula—1-5-2-4-14; solenidion formula—0-1-1-2. The solenidion ϕ_1 of the tibia is relatively thick and short while the paraxial ventral seta *v'* is thicker than the other tibial setae, and strongly pilose. The two tarsal solenidia ω_1 and ω_2 are almost of equal length and diameter.

Leg III (fig. 12b): Setal formula—2-3-1-3-13; solenidion formula—0-0-1-1-0. Solenidion ϕ_1 on the tibia is moderately long. The tarsus bears no solenidia. All ventral setae are markedly more pilose than the dorsal setae. Tarsus III is longer than tarsus II and about as long as tarsus I.

Leg IV (fig. 12a): The tibial solenidion ϕ_1 is very long. The tarsus is longer than the other three tarsi. Seta *ft'* of the tarsus and *v''* of the tibia are relatively stout.

***Brachioppia pectinata* spec. nov., figs. 13 and 14.**

Holotype: One specimen from leaves under *Leucosidia* sp. Collected by Professor R. van Pletzen on the farm Uithoek in the district of Fouriesburg on 12/12/62. Type locality F. *Paratypes*: Collected at Fouriesburg in leaves under *Leucosidia* sp. and at Fauresmith in dry soil and leaves under *Rhus burchelli*.

Colour: Light brown-yellow.

Dimensional range: Total length 308-336 μ ; width of hysterosoma 172-190 μ .

Diagnosis: The peculiar shape of the pectinate sensillar head nearly identical with that of *Oppia machadoi* Balogh, 1958; six pairs of genital setae; hysterosoma globose, with nine pairs of notogastral setae and the alveoli of setae *ta* present; small, anteriorly directed processes immediately posterior to the bothrydia.

Description of the holotype: *Prodorsum* (fig. 13) is as long as broad, and the rostrum rounded. All prodorsal setae are present. The rostral setae *ro*, inserted on the dorso-lateral part of the rostrum, are longer than their mutual distance while the inter-

lamellar setae *in* and lamellar setae *la* are shorter than their mutual distances. All prodorsal setae are glabrous.

The quadrangular field in the middle of the prodorsum as described for the other species, is present. Anterior to the lamellar setae there is a faint transverse band resembling a translamella. This is an indication of an anterior border to the quadrangular field.

Anterior to the bothrydia the light areas are distributed as in the other species of *Brachioppia*. The light areas situated between the interlamellar setae are very small, far removed from each other and indistinct. The chitinized band between the bothrydia, passes beyond the bothrydia posteriorly. On both sides it forms immediately posterior to each bothrydium a small, anteriorly directed process.

The areas of the prodorsum lateral and anterolateral to the bothrydia are inconspicuously granulated. The exobothrydial setae *ex* are fairly long and inserted on low cusps.

The sensilli are of about the same length as their mutual distance. Five (in some specimens four) branches radiate posterolaterally from each slightly expanded sensillar head. The first and second proximal branches are the longest, the other becoming gradually shorter towards the distal end of the sensillar head.

Notogaster (fig. 13): The hysterosoma is globose with nine pairs of fairly short notogastral setae. The alveoli of setae *ta* are present on the anterior chitinized band of the notogaster. The setae of pairs *ti* and *te* are inserted in an almost horizontal line, which is also the case with pairs *ms* and *r₃*, pairs *r₂* and *p₃* as well as pairs *r₁* and *p₂*. All notogastral setae are glabrous. Fissures *im* are situated anteriorly to setae *r₃*. Fissures *ia* and *ip* are distinct, the latter only visible from a posterior ventrolateral view.

Ventral side (fig. 14): Six pairs of setae are present on the genital plates. The latter are separated from the anal plates by a distance more than twice the length of the genital plates. The genital setae are fairly long. Two pairs of setae are present on the first pair of epimeres, while the other epimeres bear the usual numbers of setae. All tectopedial setae are present. Discidia are present between legs III and IV.

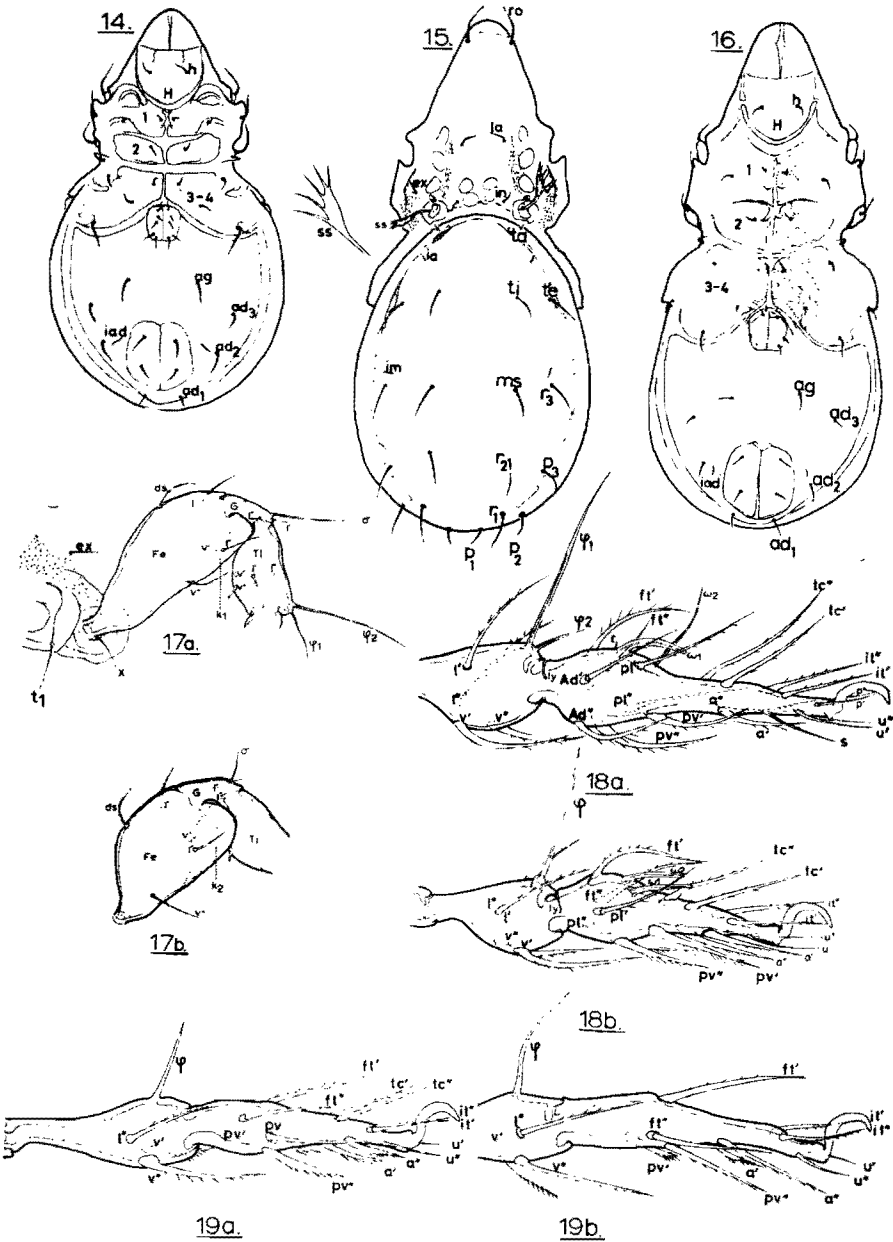
Legs: Setal formulae I: 1-5-2-4-20; II: 1-5-2-4-14; III: 2-3-1-3-13; IV: 1-2-2-3-10. Solenidion formulae I: 0-1-2-2; II: 0-1-1-2; III: 0-0-1-1-0; IV: 0-0-0-1-0.

Solenidion σ_1 of tarsus I is fairly thin, while σ_2 is even thinner. They are of about equal length. On tibia II seta *v'* is thick. On the dorsal sides, immediately posterior to each claw, the tarsi of legs II, III and IV bear a very short, inconspicuous dorsal process. The setae on the trochanters of legs III are thin and long. All other setae present are similar to those described for the other species.

General remarks: A great resemblance exists between the species described above and *Oppia machadoi* Balogh, 1958. *Oppia machadoi* however, is a little shorter and more elongated, the rostral setae are feathered and the lamellar traces are more distinct and are connected to each other by a distinct transverse band anterior to the lamellar setae. Balogh's species has ten pairs of notogastral setae, with setae *ta* very small. According to Balogh all ventral setae are small in *Oppia machadoi* while the corresponding setae of *Brachioppia pectinata* are moderately long. *Oppia machadoi* probably belongs to the genus *Brachioppia* but will provisionally be kept in the genus *Oppia* for reasons already pointed out.

***Brachioppia quathlambae* spec. nov., figs. 15-17**

Holotype: One specimen from moist soil, moss and grass at an altitude of 8,500



ft. above sea level. Collected by the author near Mont Aux Sources in the district of Witsieshoek on 3/4/64. Type locality 326. *Paratypes*: 11 other specimens were found at the type locality and these specimens fall into two categories. Three of the specimens are darkly pigmented and larger than the others. Except for the differences in colour and size, the specimens are identical and are considered to be the same species. The differences in size and colour may possibly be due to sexual dimorphism. One of the larger specimens has been designated holotype, but the dimensional range given includes the smaller specimens.

Colour: Dark brown in the holotype.

Dimensional range: Total length 300–405 μ ; Width of hysterosoma 128–196 μ .

Diagnosis: The exceptionally thick femora of legs I and II; ten pairs of notogastral setae, with setae *ta* very small; six pairs of genital setae; elongated epimeral area and relatively short ventral plate; two pairs of oval "glandular areas" on the notogaster.

Description of the holotype: *Prodorsum* (fig. 15) is slightly longer than broad with the rostrum rounded. All prodorsal setae are present. The rostral setae *ro* are inserted on the dorsolateral parts of the rostrum and are of about the same length as the distance between them. A thin transverse line runs over the rostrum anteriorly to the rostral setae. The lamellar setae *la* and the interlamellar setae *in* are shorter than their mutual distances. In the middle of the prodorsum the quadrangular field has no anterior border and the posterior border, formed by the chitinous band between the bothrydia is not as darkly chitinated as in the species of *Brachioppia* described previously. The lateral borders have a distinct foveolated appearance.

Two pairs of light areas are present between the interlamellar setae. In the holotype these areas are asymmetrical as indicated in the figure. The light areas anterior to the bothrydia are arranged as in the other species of *Brachioppia*.

Lateral to the bothrydia the sides of the prodorsum are coarsely granulated. The short exobothrydial setae *ex* are inserted on the dorsal borders of the granulated areas. The sensilli are shorter than their mutual distance, with their heads well distended and somewhat fusiform. Each sensillar head bears five pectinate radiating branches, gradually shortening towards the distal tip.

Notogaster (fig. 15): The hysterosoma is oval and about 1.5 times longer than the proterosoma, giving the species an elongated appearance. Ten pairs of notogastral setae are present. The setal pair *ta* is very small, and inserted on the chitinated anterior

EXPLANATION OF FIGURES

Fig. 14. *Brachioppia pectinata* spec. nov., ventral view.

Figs. 15–17. *Brachioppia quathlambae* spec. nov. 15. Dorsal view; 16. Ventral view; 17. Leg podomeres. a. Femur, genu and tibia of leg I, lateral view. b. Femur and genu of leg II, lateral view. *ds*: dorsal setae; *ex*: exobothrydial seta; *k*₁ and *k*₂: ventral keels of femora I and II; *l*: lateral setae; *Tc I*: tectopedium I; *t*₁: tectopedial seta; *v*: ventral setae; *x*: basal seta of leg I; ϕ : genal solenidia; ϕ_1 and ϕ_2 : solenidia of tibia I.

Figs. 18–19. *Multioppia wilsoni* Aoki, 1964. 18. Leg podomeres. a. Tibia and tarsus of leg I, medial view. b. Tibia and tarsus of leg II, medial view. *a*: antelateral setae; *Ad*: additional setae; *ft*: fastigial setae; *it*: iter setae; *l*: lateral setae; *ly*: tarsal lyrifissures; *p*: proral setae; *pl*: primilateral setae; *pv*: primiventral setae; *s*: subunguinal seta; *tc*: tectal setae; *u*: unguinal setae; *v*: ventral setae; ω : tarsal solenidia; *e*: famulus; ϕ : tibial solenidia. 19. Leg podomeres. a. Tibia and tarsus of leg III, lateral view. b. Tibia and tarsus of leg IV, lateral view. *a*: antelateral setae; *ft*: fastigial setae; *it*: iter setae; *l*: lateral setae; *ly*: lyrifissures; *pl*: primilateral seta; *pv*: primiventral setae; *tc*: tectal setae; *u*: unguinal setae; *v*: ventral setae; ϕ : tibial solenidia

band of the notogaster. Two pairs of small, inconspicuously punctated, oval areas are present, one pair medially to setae *ta* and the other pair laterally to setae *te*. These are probably glandular areas.

All the notogastral setae are of moderate length, none of them overlapping the insertion of those behind. Fissure pairs *ia*, *im* and *ip* are present, *im* being anterior to setae *r*₃. Fissures *ip* are only visible from a posterior lateroventral view.

Ventral side (fig. 16): Four pairs of setae are inserted on the lateral margins of the genital plates which are removed from the anal plates by a distance of more than twice the length of the genital plates. Fissures *iad* are situated away from, but almost parallel to the lateral margins of the anal field.

The distance from the arched posterior border of the fused posterior epimeral pairs 3-4 to the base of the hypostome is the same as the distance from the posterior border of the hysterosoma to the anterior margin of the genital plates. The ventral plate is thus relatively short and the epimeral area much elongated, appearing even more so on account of the very thin sternal ridges. The anterior epimeral pair bears two pairs of setae, the other epimeres bearing the usual numbers of setae. The medial parts of all epimeres are strongly reticulated. All tectopedial setae are present. The discidia between legs III and IV are blunt.

Legs (figs. 17a and b): All legs of this species are short and stout. The very stout femora of legs I and II (cf. fig. 17) bear ventrolateral keels *k*₁ and *k*₂.

Setal formulae I: 1-5-2-4-20; II: 1-5-2-4-14; III: 2-3-1-3-13; IV: 1-2-2-3-10. Solenidion formulae I: 0-1-2-2; II: 0-1-1-2; III: 0-0-1-1-0; IV: 0-0-0-1-0.

Leg I: Solenidion ω_1 is arched and relatively long with ω_2 inserted posterior to ω_1 on the lateral side. The famulus is fairly long and conspicuous. On the tibia ϕ_1 is only about twice as long as ϕ_2 . The femur has a stout keel *k*₁ (cf. fig. 17a) on its outer ventral side.

Leg II: On the dorsal side of the tarsus a pair of short and sharp anterior processes are present immediately posterior to the tarsal claw. The two tarsal solenidia are of about equal length and diameter. The solenidion of the tibia is fairly short. Both ventral setae of the tibia are stout. The femur which is almost as broad as it is long bears an even larger keel *k*₂ than that of femur I on its ventral side (cf. fig. 17b).

Leg III: A pair of short, sharp processes are present on the tarsus, directed anteriorly and situated in the positions usually occupied by the proral setae. The antiaxial ventral seta of the tibia is spine-like and the solenidion fairly long.

Leg IV: The tarsus bears the same processes present on tarsi II and III. The antiaxial ventral seta of the tibia is spine-like while the paraxial ventral seta is very short.

General remarks: The reason for the inclusion of this species in the genus *Brachioppia*, despite the possession of ten pairs of notogastral setae, have already been discussed. This species is possibly found only at high altitudes. The possession of femoral keels on legs I and II is highly characteristic.

Genus *MULTIOPPIA* Hammer, 1961

Type-species: *Multioppia radiata* Hammer, 1961

The following diagnostic features were given by Hammer for this genus: Twelve pairs of notogastral setae are present; the rostral setae are feathered; a middle field is demarcated on the prodorsum by faint lateral and anterior lines; the sensilli have branches radiating from the posterior borders of the compressed, clavate heads;

the process between legs III and IV on each side, has the form of a sharp tooth; fissures *iad* are adjacent and parallel to the lateral margins of the anal field; the hysterosoma is elongated and oval.

This genus is a typical oppiid genus, and can be distinguished easily from the genus *Gittella* Hammer, 1961, also possessing 12 pairs of notogastral setae, by the shape of the sensilli, the position of fissures *iad* and the shape and insertion of the rostral setae.

The following species have already been described in this genus:

1. *Multioppia radiata* Hammer, 1961.
2. *Multioppia stellifera* Hammer, 1961
3. *Multioppia australis* Hammer, 1961
4. *Multioppia wilsoni* Aoki, 1964
5. *Multioppia problematica* Balogh, 1966
6. *Multioppia pectinata* Balogh, 1967 (?*Gittella*)

A short key is given by Aoki (1964) to distinguish between the first four species.

Jacot (1938) described *Oppia carolinae* and a subspecies *Oppia carolinae barbatis*. This species and subspecies correspond exactly with the generic diagnosis of *Multioppia*.

The generic name has therefore to be changed to *Multioppia*:

7. *Multioppia carolinae* (Jacot, 1938) **comb. nov.** (= *Oppia carolinae* Jacot, 1938)
8. *Multioppia carolinae barbatis* (Jacot, 1938) **comb. nov.** (= *Oppia carolinae barbatis* Jacot, 1938)

The arrangement of notogastral setae in *Multioppia carolinae* resembles that of *Multioppia wilsoni* closely, and the two species may be conspecific. It is, however, difficult to determine this, for Jacot's figures do not show the same details as those of Aoki.

In 1922 Schweizer identified an oribatid specimen from Tamangur as *Dameosoma fasciatum* Paoli, 1908. Certain morphological similarities can be deduced from the figures supplied by Schweizer (1922) and Paoli (1908), but Schweizer's figure shows twelve pairs of notogastral setae while that of Paoli shows only eight pairs. Schweizer re-examined his specimen from Tamangur in 1956 and offered a new drawing, which shows eight pairs of notogastral setae. The original figure given by Schweizer in 1922 accords with that of *Multioppia wilsoni*, especially as far as the number and arrangement of notogastral setae are concerned. However, by redrawing this specimen in 1956, Schweizer apparently declared his figure of 1922 invalid. It is thus impossible for the present author to know whether a *Multioppia* species is present in the Schweizer collection or not.

The genus *Multioppia* is represented in the Orange Free State by *Multioppia wilsoni* Aoki, 1964. Dr Aoki kindly compared specimens and figures sent to him with paratypes of *Multioppia wilsoni* preserved at the National Science Museum in Tokyo. In a personal communication he confirmed the identification of the South African specimens as *Multioppia wilsoni* Aoki, 1964.

Multioppia wilsoni Aoki, 1964

Occurrence: Fairly widespread

Colour: Light brown.

Dimensional range: Total length 240–300 μ ; width of hysterosoma 129–140 μ .

Only a few slight morphological differences exist between the specimens found in the Orange Free State and those from Laysan Island described by Aoki. The prodorsum corresponds exactly to the description of Aoki. On the notogaster only the fissures *ih* could not be located. Ventrally the distance between the genital and anal plates is

almost twice as long as the genital plates and not more than twice, as is the case with Aoki's specimens. Setal pair ad_2 is also inserted much closer to the lateral margins of the anal field than in Aoki's specimens, and setal pair ad_3 is not distinctly barbed. The number of genital setae given in Aoki's description as six pairs must be five pairs, as is indicated in his figure.

The leg chaetotaxy is not discussed by Aoki and is thus given here (cf. figs. 18 and 19): Setal formulae I: 1-5-2-4-20; II: 1-5-2-4-14; III: 2-3-1-3-13; IV: 1-2-2-3-10. Solenidion formulae I: 0-1-2-2; II: 0-1-1-2; III: 0-0-1-1-0; IV: 0-0-0-1-0.

Leg I: Solenidion ω_1 of the tarsus is thick and arched while ω_2 is long and thin. The subunguinal seta s is distinctly eupathidial. On the tibia ϕ_1 is almost four times as long as ϕ_2 (cf. fig. 18a).

Leg II: The two tarsal solenidia ω_1 and ω_2 are of about equal length and diameter. Seta ft' is stout and arches over the solenidia. The solenidion ϕ_1 of tibia II is moderately long (cf. fig. 18b).

Leg III: The solenidia ϕ_1 and σ of the tibia and genu, are both relatively short. Seta v' of the tibia and setae pv' and a' of the tarsus are all short and feathered (cf. fig. 19a).

Leg IV: The solenidion ϕ_1 of tibia IV is longer than that of tibia III, but is still rather short. Setae v' of the tibia and pv' and a' of the tarsus, are short and feathered (cf. fig. 19b.)

Genus *OPPIA* C. L. Koch, 1836

Type-species: *Oppia nitens* C. L. Koch, 1836

Koch (1836) briefly described two species, *Oppia glaucina* and *Oppia nitens*, but he neither gave any generic diagnosis nor did he indicate which of the two species was the type-species. In 1842 Koch indicated *Oppia nitens* as type-species of the genus *Oppia*, and he gave the following generic diagnosis: "*Körper*: Vorder- und Hinterleib deutlich abgesetzt, erster vom Grunde aus etwas dick, dann von einem Seiteneck an gegen die Spitze kegelförmig auslaufend; Hinterleib rund oder eiförmig, merklich dicker als der Vorderleib; auf letztem nicht immer zwei Stirnzapfen wie bei Oribates beständig aber eine Seitenborste von verschiedener Gestalt.

Augen: nicht sichtbar. *Rüssel*: versteckt. *Taster*: dünn, frei übrigens wie bei Oribates. *Beine*: lang und dünn, alle Glieder bis zum Endglied beulig verdickt und an der Wurzel sehr dünn, das Endglied an der Wurzel aber verdickt; steife Borsten einzeln stehend."

In 1842, when Koch formulated the generic diagnosis, the knowledge of oribatid morphology was very limited and the diagnosis therefore does not comply with present requirements. Several authors after Koch gave new diagnoses of the genus and redescriptions of *Oppia nitens* (e.g. Canestrini & Fanzago, 1877; Canestrini, 1885; Hull, 1916a; Willmann, 1931; Jacot, 1934; van der Hammen, 1952; Schweizer, 1956; and Sellnick, 1960a). Apart from these descriptions of the genus *Oppia*, descriptions have also been given of synonymous genera such as *Dameosoma* Berlese, 1892, *Amolops* Hull, 1916, *Dissorhina* Hull, 1916, and others. A detailed discussion of the genus *Dameosoma* has been given by Paoli (1908).

The genus *Oppia* is a much discussed genus and since its establishment it has become a collective genus in which all taxonomically problematical species of the family Oppiidae, as well as many non-oppiid species, have been included. This is

suggested by the fact that the genus *Oppia* has at present about 200 valid and invalid species and subspecies, while the next largest genus of the family includes only 20 taxa (cf. *Amerioppia* Hammer, 1961). In 1962, Hammer pointed out that she has "... come across so many species which have generally been placed under the genus *Oppia*, although with so great differences, that it is startling that these widely different species should really be considered as belonging to the same genus".

Due to the diversity of species within the genus *Oppia*, it is difficult, if not impossible, to give a generic diagnosis to include all species and distinguish between the genus *Oppia* and other genera of the family Oppiidae. Any group of diagnostic features will inevitably exclude some of the present species of *Oppia*, which is urgently necessary.

The following diagnosis for the genus *Oppia* is proposed by the present author, well realising that it may be changed in future as knowledge of this group increases.

The general shape is slender, with the proterosoma usually as long as it is broad and the hysterosoma ovally elongated to globose. Typical lamellae are absent and at most lamellar and translamellar traces may be present. All prodorsal setae, *ro*, *la*, *in* and *ex*, are always present. A granulation of the cerotegument is mostly present on the lateral sides of the prodorsum, lateral and anterolateral to the bothrydia in the areas of insertion of legs I, II and III. Except for paired "light areas", which may be present anterior to the bothrydia and between the interlamellar setae, granulation or distinct impressions are usually absent on the prodorsum. The bothrydia are cup-shaped with the anteriorly curved, non-protruding basal parts of the sensilli visible anterior to the bothrydia as short, loop-shaped processes beneath the cuticula. The form of the sensilli is variable and they may be glabrous, pilose or with radiating branches. Nine or ten pairs of notogastral setae are present, of which setae *ta* are either absent or small and inserted on the anterior border of the notogaster. The length of the notogastral setae is variable. Setae *ta* are often minute, but the other notogastral setae are usually moderately long. The notogastral lyrifissures are usually distinct and glandular areas may be observed on the notogaster. No notogastral depressions or ornamentations are present. On the ventral side the distance between the genital and anal plates is about twice the length of the genital plates, the latter being much smaller than the anal plates. Four, five or six pairs of genital setae may be present. Fissures *iad* may be situated parallel or oblique to, and removed from or adjacent to the lateral margins of the anal field. Three pairs of epimeres are present, the posterior epimeral pair representing the fused third and fourth epimeral pairs. The posterior borders of the fused epimeral pairs 3-4, are always arched posteriorly, on each side passing beyond or nearly beyond the posterior border of the genital field. Tectopodia III usually form a sharp process (dis-cidium) on each side between legs III and IV.

The genus *Oppia* is represented in the Orange Free State by one known species, four new species and one new subspecies.

Oppia minutissima Sellnick, 1950

This species is recorded only from Bloemfontein, in plant material from a poplar grove. Except for the possession of ten pairs of notogastral setae, the specimens correspond completely with the original description. Hammer (1961a) gave a figure of *Oppia minutissima* in which she indicated the presence of ten pairs of notogastral setae.

***Oppia falxa* spec. nov., figs. 20 and 21**

Holotype: One specimen from needles of a pine tree. Collected by Mr. A. J. Els at Ladybrand on 2/12/62. Type locality 130E. **Paratypes:** Only one other specimen collected from the type locality.

Colour: Light brown.

Dimensions: Total length of holotype, 235 μ ; of other specimen, 242 μ ; width of hysterosoma of holotype, 122 μ ; of other specimen, 130 μ .

Diagnosis: Fusiform sensilli, resembling a scythe, whence the name; interlamellar setae very short; nine pairs of notogastral setae, and only the alveoli of the tenth pair *ta* present; five pairs of genital setae.

Description of the holotype: *Prodorsum* (fig. 20) is as long as broad with the rostrum rounded. The rostral setae *ro* are inserted on the dorsolateral sides of the rostrum, curved inwards, glabrous and about the same length as their mutual distance. The thin, glabrous lamellar setae *la* are about as long as their mutual distance, while the interlamellar setae *in* are very small, but distinct.

Medially to the interlamellar setae two pairs of indistinct light areas are present. Their posterior borders are more distinct than their anterior borders. Anterior to the bothrydia three pairs of more distinct light areas are present.

Chitinized ridges are present on the lateral sides of the prodorsum. The anterior parts of these ridges curve slightly to the dorsal side of the prodorsum and end anterolaterally to the lamellar setae. A faint indication of a translamellar ridge is present anterior to the lamellar setae. It almost connects the apices of the lateral ridges. Laterally to the bothrydia the sides of the prodorsum are finely granulated, while the remaining part of the prodorsum is glabrous. The exobothrydial setae *ex* are probably absent or very small as they could not be located.

The sensilli are reminiscent of a scythe. The sensillar heads are fusiform, end in very thin distal apices, and are directed forwards and inwards.

Notogaster (fig. 20) is sub-oval. Nine pairs of notogastral setae are present, and only the alveoli of the tenth pair *ta*, situated immediately posterior to the bothrydia on the distinct chitinized band of the notogaster. All notogastral setae are fairly short and glabrous. The setae of pairs *p*₁ and *p*₂ appear to be shorter than the others, while setal pair *r*₁ is slightly longer than the remaining notogastral setae. The fissures *ia* and *im* are distinctly visible on the dorsal side, while fissures *ip* are only visible from a posterior ventrolateral view.

Ventral side (fig. 21): The genital plates are removed from the anal plates by a distance more than twice their length. Five pairs of genital setae are present. Fissures *iad* are removed from and oblique to the lateral margins of the anal field. Two pairs of setae are inserted on the first pair of epimeres, one pair on the second and four pairs on the fused posterior epimeral pair 3-4. All epimeral setae are fairly short except the posterolateral setae on the posterior pair of epimeres, which are fairly long. The epimeres are slightly reticulated medially. All tectopedial setae are present and the discidia between legs III and IV, are sharp and pointed.

Legs: Setal formulae I: 1-5-2-4-20; II: 1-5-2-4-14; III: 2-3-1-3-13; IV: 1-2-2-3-10. Solenidion formulae I: 0-1-2-2; II: 0-1-1-2; III: 0-0-1-1-0; IV: 0-0-0-1-0.

The claws of all tarsi are weakly developed. On tarsus I the famulus is distinct. Solenidion ϕ_1 on tibia I is about twice the length of ϕ_2 . The solenidion of tibia

two is very short. On genu III the solenidion is very short while the solenidion of tibia III is moderately long, but shorter than that of tibia IV.

General remarks: Although differing from them in many respects, *Oppia falxa* bears a resemblance to *O. ventronodosa* Hammer, 1962, *O. bicristata* Hammer, 1962, and *O. fusuligera* Balogh, 1962, especially as far as the sensillar form and general appearance is concerned.

***Oppia parva* spec. nov., figs. 22 and 23**

Holotype: One specimen from moist soil and grass near Acacia karroo trees. Collected by the author near Orkney, on the southern bank of the Vaal River on 6/12/63. Type locality 280. *Paratypes:* Collected only at the type locality.

Colour: Light yellow-brown.

Dimensional range: Total length 203–218 μ ; width of hysterosoma 90–103 μ .

Diagnosis: A very small species, smaller than most other oppiid species; short sensilli with expanded, finely pectinate heads; the anterior border of the hysterosoma overlaps the bases of the bothrydia to some extent; nine pairs of short notogastral setae on the elongated hysterosoma; five pairs of genital setae.

Description of the holotype: *Prodorsum* (fig. 22) is slightly shorter than it is broad and the rostrum is rounded. All prodorsal setae are present. The rostral setae *ro* are much longer than their mutual distance, and are inserted on the dorsal side of the rostrum. They are finely pilose. A distinct transverse line is present on the rostrum, close behind the rostral setae. The lamellar setae *la* and the interlamellar setae *in* are glabrous and about half the length of their mutual distances. The interlamellar setae appear a little shorter than they actually are, because they are directed upwards.

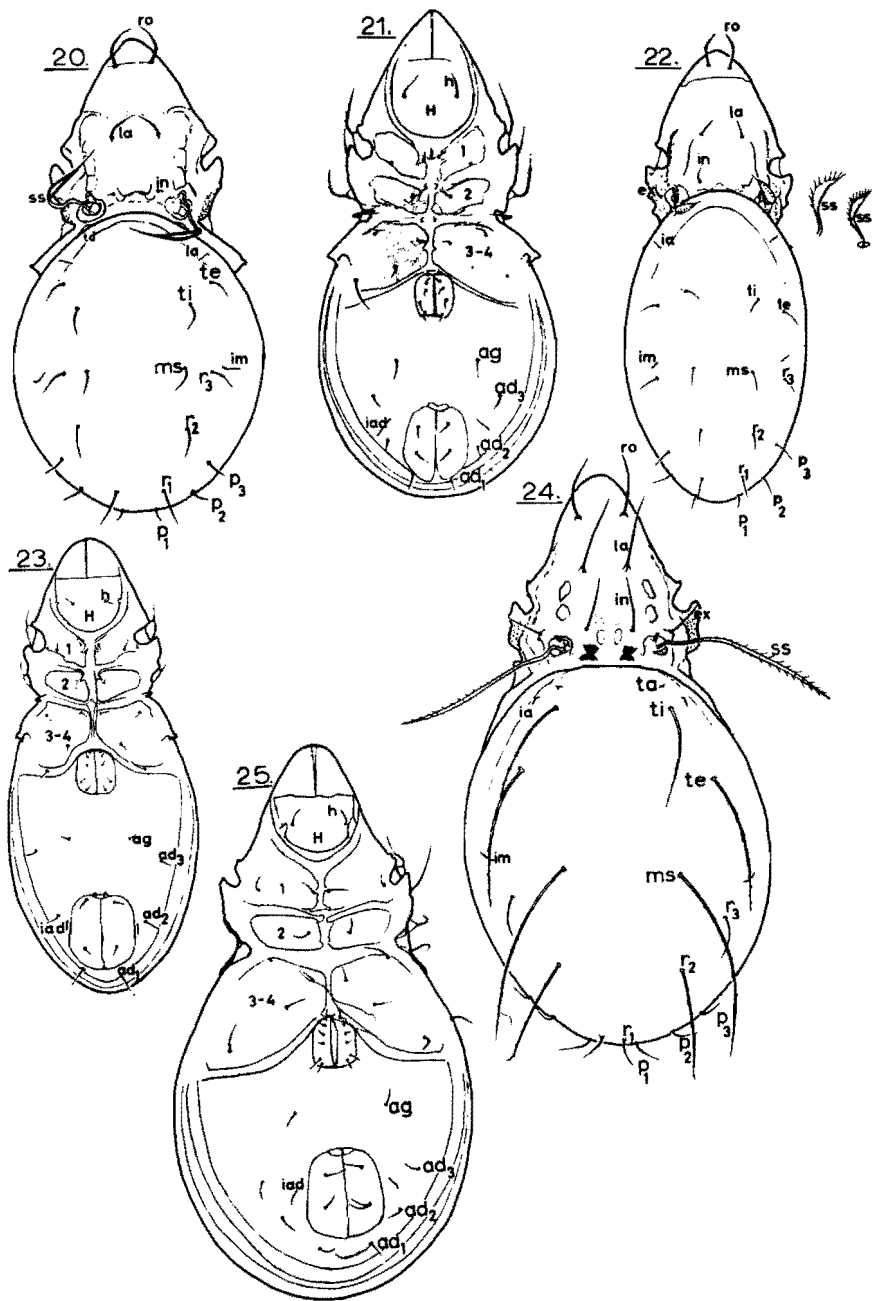
The prodorsum bears thin, S-shaped, pigmented lines situated between the bothrydia and the lamellar setae.

The lateral sides of the prodorsum are only very slightly granulated in the areas of insertion of legs I, II and III. These granulated areas are best visible from the lateral side. The exobothrydial setae *ex* are small and inserted laterally to the bothrydia. A darker pigmented ridge is present on each side anterior to the exobothrydial setae.

The anterior border of the notogaster overlaps the posterior parts of the bothrydia to some extent. The chitinized band present on the posterior part of the prodorsum between the bothrydia, is almost completely concealed by the overlapping notogaster. The sensillar stalks are short and the heads of the sensilli distended and set with 12 to 13 short bristles. These bristles are arranged on the outer edges of the sensillar heads. The sensillar stalks are directed upwards, with the distal apices of the sensillar heads pointing inwards while the radiating bristles point dorsally.

Notogaster (fig. 22): The hysterosoma is oval in shape and much longer than broad. Nine pairs of short, thin notogastral setae are present. The anterior third of the notogaster bears no setae and this fact, together with the elongated shape of the hysterosoma, gives the impression of the notogastral setae being inserted far posteriorly. Setal pair *ta* is absent without even a trace of its alveoli being present. Fissures *ia*, *im* and *ip* are present, the latter being visible from a posterior ventrolateral view only. The anterior chitinized band of the notogaster is broad, and from a lateral view it appears as if the anterior part of the notogaster forms a slightly overlapping ledge over the posterior part of the prodorsum.

Ventral side (fig. 23): On the ventral plate setal pair *ad*₁ is longest and is inserted posterior to the anal plates. The adanal setae become progressively shorter from



ad_1 to ad_3 , while the agenital setae ag are the shortest. The distance between the anal plate and the genital plates is more than twice the length of the genital plates. Five pairs of genital setae are present. Fissures iad are situated adjacent and parallel to the lateral margins of the anal field.

Three pairs of setae are present on the first pair of epimeres. The outer of these pairs is very small and is easily overlooked. On the other pairs of epimeres the usual numbers of epimeral setae are present. All epimeral setae are short. The sternal ridges are fairly broad. The setae of tectopodia I are absent. The discidia between legs III and IV are sharply pointed.

Legs. On account of the fact that this species is very small, it is difficult to examine the leg chaetotaxy without high magnifications, which render crushing of the specimens necessary in order to get the legs in a horizontal plane. As only 12 specimens of this species are available, it is not desirable to destroy any of them. The setal and solenidion formulae of the leg podomeres, and especially of the tarsi, can thus not be given in detail at present.

Setal formulae I: 1-5-?-4-?; II: 1-5-?-4-?; III: ?-3-?-3-?; IV: ?-2-?-3-10. Solenidion formulae I: 0-1-2-2; II: 0-1-1-2-?; III: 0-0-1-1-0; IV: 0-0-0-1-0.

Solenidion ω_1 of the tarsus I is very thick, even thicker than the arched claw, while ω_2 is very thin. All other setae of the tarsi appear to be present. Tarsus II apparently has two solenidia.

General remarks: Paoli (1908), Ewing (1917) and Sellnick (1950) all described very small species of *Oppia*. *O. minutissima* Sellnick, 1950 and *O. minus* (Paoli, 1908) are both about $175\mu \times 75\mu$, and are also very similar, if not conspecific. *O. minuta* (Ewing, 1917) is larger and differs from the species mentioned above in several respects. *O. parva* differs from these three species in that it is larger than *O. minutissima* and *O. minus*, but smaller than *O. minuta*. Apart from the difference in size, *O. parva* differs from the other three species in several other respects.

***Oppia quattuor* spec. nov., figs. 24 and 25**

Holotype: One specimen from leaves and soil under poplar trees. Collected by Professor R. van Pletzen on the farm Uithoek in the district of Fouriesburg on 19/12/62. Type locality E. **Paratypes:** Only one from leaves under *Leucosidia* sp. at Fouriesburg. Colour: Yellow-brown.

Dimensional range: Total length 408-438 μ ; width of hysterosoma 222-258 μ .

Diagnosis: Four small, chitinized cusps present on the posterior part of the prodorsum, between the bothrydia; four of the ten pairs of notogastral setae very long and feathered; sensilli very long and barbed; rostral, lamellar and exobothrydial setae inserted on small apophyses; six pairs of genital setae.

Description of the holotype: *Prodorsum* (fig. 24) is as long as broad, with the rostrum rounded. All prodorsal setae are present. The rostral setae ro are inserted on the dorsolateral sides of the rostrum. They are glabrous and longer than their mutual distance. The lamellar setae la are long and glabrous and inserted on very small apophyses.

EXPLANATION OF FIGURES

Figs. 20-21. *Oppia falxa* spec. nov. 20. Dorsal view; 21. Ventral view.

Figs. 22-23. *Oppia parva* spec. nov. 22. Dorsal view; 23. ventral view.

Figs. 24-25. *Oppia quattuor* spec. nov. 24. Dorsal view; 25. Ventral view.

They are about one and a half times as long as their mutual distance. The interlamellar setae *in* are only a little longer than their mutual distance and of about the same length as the rostral setae.

Anterior to the bothrydia are two pairs of light areas. Medially to the interlamellar setae another two pairs of less distinct areas are present. Four distinct chitinized cusps are present posteriorly to the interlamellar setae, between the bothrydia. These cusps are flat and blunt and are arranged in two pairs. The apices of each pair are in contact with each other.

The exobothrydial setae *ex* are inserted on low apophyses anterolaterally to the bothrydia. The areas of insertion of legs I, II and III are granulated. Only a small part of these granulated areas can be seen from the dorsal side.

The sensilli are about as long as the prodorsum and the sensillar heads are not distended. The middle part of each sensillar head is only very slightly thicker than the proximal and distal parts. The sensilli end in sharp distal apices and are distinctly barbed for about two-thirds of their length.

Notogaster (fig. 24): Ten pairs of notogastral setae are present on the oval hysterosoma. The length of these setae differ extremely. The setae of pair *ta* are almost invisibly minute, being about 3μ in length, and are inserted on small apophyses. The setal pairs *ti*, *te* and *r₂* are very long and covered with small bristles. Setal pairs *ti* and *r₂* are about 88μ , pair *te* about 100μ and pair *ms* about 130μ . The remaining pairs *p₁₋₃*, *r₁* and *r₃* are all glabrous, thin and relatively short.

Fissures *ia*, *im* and *ip* are present. Fissures *ia* are situated parallel to the anterolateral border of the notogaster and not perpendicular to it as is usually the case. The anterior chitinized band of the notogaster is thin.

Ventral side (fig. 25): The four pairs of setae *ad₁₋₃* and *ag* on the ventral plate, are of about equal length. Fissures *iad* are remote from and oblique to the lateral margins of the anal plates. The anal plates are remote from the posterior border of the ventral plate. The distance between the genital plates and the anal plates is less than the length of the anal plates and about 1.25 times the length of the genital plates. Six pairs of genital setae are present. In the type specimen the left posterior anal seta is bifurcated along its entire length, but in the other specimens all setae are normal. The anterior epimeral pair has two pairs of setae, while the other epimeral pairs have the normal numbers of setae.

The discidia between legs III and IV are absent. All tectopedial setae are present.

Legs: Setal formulae I: 1-5-2-4-20; II: 1-5-2-4-14; III: 2-3-1-3-13; IV: 1-2-2-3-10. Solenidion formulae I: 0-1-2-2; II: 0-1-1-2; III: 0-0-1-1-0; IV: 0-0-0-1-0.

On tarsus I the solenidion ω_1 is as thick and long as is usually the case with the Oppiidae, but it is erect and not arched. Solenidion ω_2 is inserted posterior to ω_1 and is of the about the same length but thinner. The famulus is very thin. The two solenidia of tarsus II are of about equal length and diameter. All other setae and solenidia show no conspicuous differences with those usually present in the family.

A very short process is present on the dorsal side of each tarsus of legs II, III and IV, immediately posterior to the bases of the claws. These processes are directed obliquely forward.

General remarks: The sensilli of *Oppia quattuor* resemble those of *Oppia heterosa* Wallwork, 1964 very closely. Apart from that the two species also show some resem-

blance in general appearance. There is also a close resemblance between *Oppia quattuor* and *Oppia antennata* Balogh, 1966.

***Oppia pletzenae* spec. nov., figs. 26 and 27**

Holotype: One specimen from plant material under *Opuntia* sp. Collected by Professor R. van Pletzen on the farm Uithoek in the district Fouriesburg on 17/12/62. Type locality A. *Paratypes*: Collected at the Willem Pretorius Game Reserve in soil and leaves under *Ziziphus* sp. and at Verkykerskop in soil under *Salix* sp.

Colour: Yellow-brown.

Dimensional range: Total length 390–414 μ ; width of the hysterosoma 220–234 μ .

Diagnosis: All prodorsal and notogastral setae pilose; two posteriorly directed cusps present in the posterior part of the prodorsum between the bothrydia; six pairs of genital setae present; the sensillar heads slightly distended and pectinate; interlamellar setae long, reaching the insertions of the rostral setae.

Description of the holotype: *Prodorsum* (fig. 26) is as long as broad, with the rostrum rounded. All setae are present. The rostral setae *ro* are inserted on the dorso-lateral sides of the rostrum. They are finely pilose and longer than their mutual distance. The pilose lamellar setae *la* are twice as long as their mutual distance and reach the insertions of the rostral setae. The interlamellar setae *in* are directed upwards and are longer than their mutual distance. Faint transverse lines are present anterior to the insertions of the lamellar setae. Another transverse line is present anterior to the rostral setae.

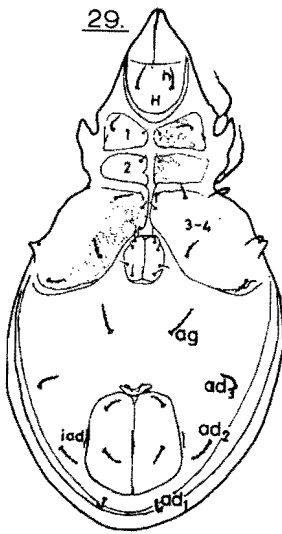
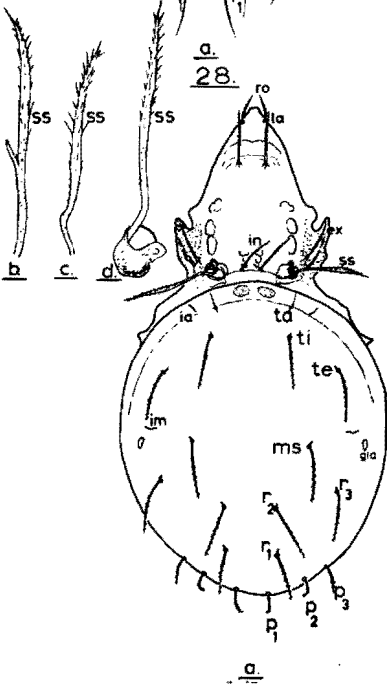
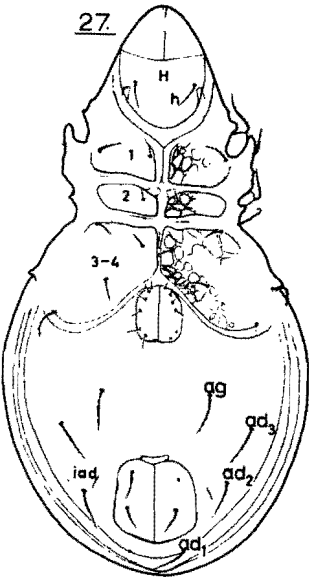
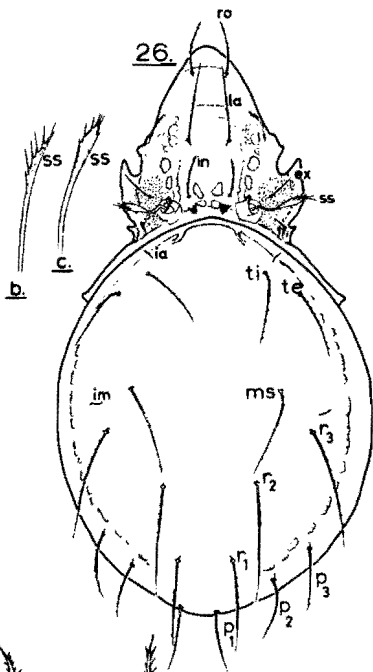
Anterior to the bothrydia are two pairs of distinct light areas. A few less distinct, smaller light areas are situated anteriorly to these light areas, laterally to the lamellar setae. A slightly darker chitinized ridge runs forward on each side, from the bothrydia towards the lamellar setae. These ridges, together with the posterior chitinized band between the bothrydia, enclose a quadrangular field similar to that described for the genus *Brachioppia*. Two pairs of distinct light areas are present between the interlamellar setae. Posterolaterally to these are two low, chitinized cusps which are directed posteriorly, but do not reach the sutura dorsosejugal.

The lateral sides of the prodorsum are distinctly granulated, the granulations reaching the outer borders of the bothrydia, and extending from the acetabula of the first pair of legs to those of the third pair. The fairly long exobothrydial setae *ex* are inserted anterolaterally to the bothrydia. The bothrydia have a relatively short mutual distance.

The sensilli are short and possess slightly distended, elongated heads, having a varying number of radiating branches (cf. figs. 26b and c.)

Notogaster (fig. 26a): Nine pairs of unilaterally barbed, pilose setae are present on the oval notogaster. The tenth pair *ta* is totally absent, without even a trace of their alveoli being present. Of the notogastral setae the pairs *r*₂ and *r*₃ are the longest while the setae of the *p*-series are the shortest. All the remaining setal pairs are of about equal length. Fissures *ia*, *im* and *ip* are all distinct, the latter only in a posterior ventrolateral view. The anterior chitinized band of the notogaster bears two short, symmetrically arranged processes directed backwards and outwards.

Ventral side (fig. 27): The four pairs of setae on the ventral plate are all unilaterally barbed. The genital plates are more than twice their own length away from the anal plates. Fissures *iad* are situated obliquely to and away from the lateral



margins of the anal field. Six pairs of thin, glabrous setae are present on the genital plates, arranged as indicated in fig. 27. The anterior pair of epimeres has two pairs of setae. The other epimeral pairs bear the usual numbers of one and four pairs of setae respectively. The medial setae of the epimeres are glabrous while the outer setae are pilose. The epimeres are slightly reticulated medially. All tectopedial setae are present and the discidia between legs III and IV are short.

Legs: Setal formulae I: 1-5-2-4-20; II: 1-5-2-4-14; III: 2-3-1-3-13; IV: 1-2-2-3-10. Solenidion formulae I: 0-1-2-2; II: 0-1-1-2; III: 0-0-1-1-0; IV: 0-0-0-1-0.

On tarsus I the solenidion ω_2 is inserted posterior to the thick and arched ω_1 , and it is about as long as ω_1 but thinner and erect. The famulus is thin and short. Seta *ft'* is long and arched to the same degree as ω_1 . The two solenidia of tarsus II are of about equal length and diameter, as is usually the case.

***Oppia yodai africana* subspec. nov., figs. 28-31**

Holotype: One specimen from compost in the University Botanic Garden. Collected by Professor R. van Pletzen on 6/11/59. Type locality IX. *Paratypes:* Collected at the same and nearby localities and at Theunissen and Jacobsdal.

Colour: Dark-brown.

Dimensional range: Total length 564-600 μ ; width of hysterosoma 312-336 μ .

Diagnosis: All dorsal setae pilose, except notogastral setae *ta*; lamellar setae very long, extending forward beyond the insertion of the rostral setae; interlamellar setae long and directed upwards; triangular processes present posteriorly to the bothrydia; sensilli lanceolate and set with distinct bristles; five pairs of genital setae are present.

Dr. Aoki has been so kind as to compare specimens sent to him with the holotype of *Oppia yodai* Aoki, 1965. He came to the conclusion that a new species instead of a subspecies of *O. yodai* should be established, on account of the following differences, which the present author also found: a. As far as the body size is concerned *O. yodai* is considerably smaller (412-433 μ \times 234-249 μ) than the specimens from the Orange Free State; b. The rostrum of the specimens from the Orange Free State is more pointed than that of *O. yodai*; c. The sensilli of *O. yodai* are much more distended than those of the specimens from the Orange Free State; d. The legs, especially the tarsi, of the specimens from the Orange Free State are much more slender than those of *O. yodai*.

All other features of the specimens from the Orange Free State correspond almost completely with the features of the specimens from Thailand. The relative importance of the differing characters is difficult to determine. These differences may perhaps be regarded as slight variations between different populations. Therefore the specimens from the Orange Free State are at present regarded as a subspecies of *O. yodai*.

In the following description mainly the differences between the new subspecies and the form from Thailand will be discussed.

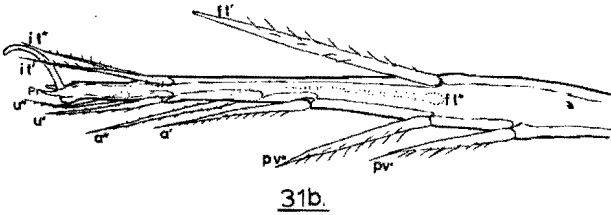
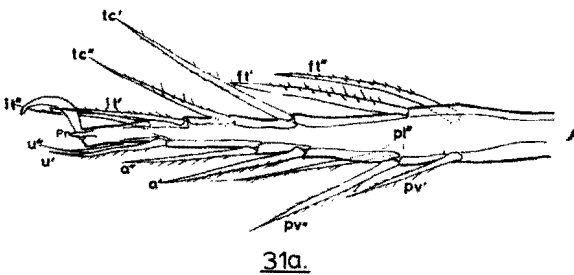
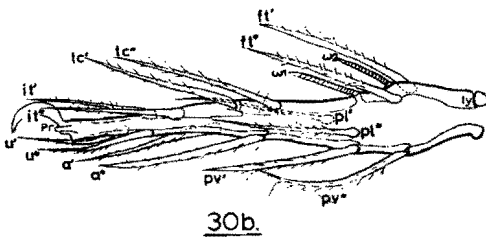
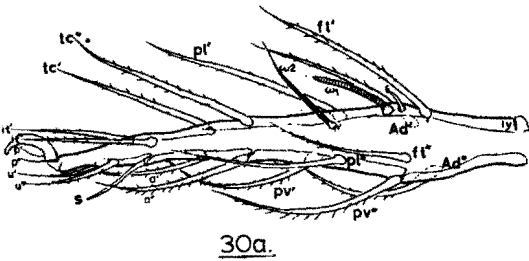
EXPLANATION OF FIGURES

Fig. 26. *Oppia pletzenae* spec. nov. a. Dorsal view. b. and c. Sensilli of specimens other than the holotype.

Fig. 27. *Oppia pletzenae* spec. nov., ventral view.

Fig. 28. *Oppia yodai africana* subspec. nov. a. Dorsal view. b. Sensillus of a specimen other than the holotype. c. and d. Right and left sensilli of the holotype.

Fig. 29. *Oppia yodai africana* subspec. nov., ventral view.



Prodorsum (fig. 28): The rostrum is pointed and longer than broad. The main difference between Aoki's material and the new subspecies lies in the form of the sensillus. Aoki (1965) gave the following description of the sensillar head: "Er hat einen 3-seitig geschwollenen, spindelförmigen Kopf, dessen geschwollene Seiten mit längeren Börstchen als seine ungeschwollene Seite besetzt sind." Despite some variation in form (see figs. 28b, c and d), the sensillar heads of the subspecies are never distended to nearly the same extent as in the Thailand specimens. The sensilli are lanceolate and set with bristles for about two thirds of their length. The middle parts of the sensilli are very slightly broader than the proximal parts, and the sensillar heads end in sharply pointed apices. Figure 30b shows the sensillus of a specimen other than the holotype. It was the only sensillus found to possess a projecting process.

Notogaster (fig. 28): The positions and lengths of the notogastral setae correspond almost exactly with those of Aoki's specimens. Two very distinct, punctate areas are situated on the anterior chitinated band of the notogaster, posterior to the interlamellar setae *in*. They probably represent glandular areas.

Ventral side (fig. 29): The anterior anal setae are not inserted as close to the margins of the anal plates as in the Thailand specimens. The distance between the aggenital setae *ag* is shorter in the subspecies than in the species.

Legs (figs. 30 and 31): The leg chaetotaxy of the Thailand specimens was not discussed by Aoki. As mentioned above, Dr Aoki found that the legs, especially the tarsi, are much more slender than those of the specimens he studied.

The leg chaetotaxy of *Oppia yodai africana* does not show any conspicuous differences from that of other Oppiidae. Setal formulae I: 1-5-2-4-20; II: 1-5-2-4-14; III: 2-3-1-3-13; IV: 1-2-2-3-10. Solenidion formulae I: 0-1-2-2; II: 0-1-1-2; III: 0-0-1-1-0; IV: 0-0-0-1-0.

On tarsus I the ungual setae *u* are inserted rather far back and are pilose. Solenidion ϕ_1 of the tibia is less than twice as long as solenidion ϕ_2 .

Pointed processes *Pr* are present laterally to the claws of tarsi II, III and IV, in the positions usually occupied by the proral setae. These processes are conspicuous and most distinct on tarsus IV. Seta *ft'* on tarsus III is a very stout, spine-like seta.

Tarsus IV is extremely long with a weakly developed claw. The length of the tarsi are as follows: Tarsus I 162 μ , tarsus II 145 μ , tarsus III 164 μ and tarsus IV 192 μ .

General remarks: *Oppia yodai africana* resembles the following species of *Oppia*:

(a) *Oppia kühnelti* Csiszár, 1961. The sensilli of this species are "... slightly fusiform apically, pointed with some very minute ciliae" (Csiszár, 1961). The sensilli of the new subspecies are conspicuously set with small, but not minute bristles. The ventral setae are also longer than in *O. kühnelti*. All notogastral setae are pilose, whereas *p*₁ and *p*₃ are glabrous in *O. kühnelti*.

(b) *Oppia varians* Wallwork, 1961. The lamellar setae of *O. varians* are inserted further back on the prodorsum, and do not reach the insertions of the rostral setae. On the ventral side the fissures *iad* of *O. varians* are situated in slightly different posi-

EXPLANATION OF FIGURES

Figs. 30-31. *Oppia yodai africana* subsp. nov. 30 Leg podomeres. a. Tarsus I, lateral view. b. Tarsus II, lateral view. *a*: antelateral setae; *Ad*: additional setae; *ft*: fastigial setae; *it*: iter lateral setae; *ly*: tarsal lyrifissures; *p*: proral setae; *pl*: primilateral setae; *Pr*: tarsal process; *pv*: primiventral setae; *s*: subunguinal seta; *tc*: tectal setae; *u*: ungual setae; ω : tarsal solenidia; ϵ : famulus. 31. Leg podomeres. a. Tarsus III, medial view. b. Tarsus IV, medial view. *a*: antelateral setae; *ft*: fastigial setae; *it*: iter lateral setae; *ly*: tarsal lyrifissures; *pl*: primilateral seta; *Pr*: tarsal processes; *pv*: primiventral setae; *tc*: tectal setae; *u*: ungual setae.

tions than in the new subspecies. The adanal setae *ad*₃ are inserted much more anterior in *O. varians* than in *O. yodai africana*.

Genus *OPPIELLA* Jacot, 1937

Type-species: *Dameosoma corrugatum* Berlese, 1904

Jacot (1937) gave the following brief diagnosis with the establishment of the genus: "Differs from *Oppia* in that the notogaster is moderately arched, often with anterior band more or less raised as a ridge, bearing eighteen bristles, often with an additional pair on anterior peripheral band; sides of thorax above legs II and III usually smooth or with a few low ridges; cephalothorax often with conspicuous knobs or/and ridges; tectopodia II variously developed."

This diagnosis is actually insignificant and does not give any definite indication of the morphological features typical of the genus. After Jacot only Hammer (1962a) recognized the genus *Oppiella*, while Balogh (1965) still treats it as a synonym of the genus *Oppia*. It is the opinion of the present author that it is necessary to re-establish the genus for two reasons. Firstly the genus *Oppiella* shows several characteristic features, which distinguish it from all other oppiid genera. Secondly it has become essential to reduce the number of species in the genus *Oppia* in an endeavour to elucidate the present confusion within the genus.

The following more complete diagnosis is proposed for the genus *Oppiella*. At present it will be somewhat restricting, excluding all species not closely resembling the type-species *Oppiella nova* (Oudemans, 1902) (= *Dameosoma corrugatum* Berlese, 1904), at least as far as the chitinized prodorsal ridges and the shape of the sensilli are concerned. Future workers may find it necessary to change the present diagnosis into a more comprehensive diagnosis which would include more *Oppia* species.

Proposed diagnosis: All prodorsal setae are always present. These are the rostral, lamellar, interlamellar and exobothrydial setae. Two distinct lamellar ridges are present on the prodorsum. These lamellae are converging for about half their length, the remaining anterior parts being parallel to each other, with the lamellar setae inserted on or immediately anterior to their apices. A translamella, or only a trace of it, may be present at the point in which the lamellae first become parallel to each other. An interlamellar ridge, which converges and curves anteriorly, and which mostly has a broader posterior part, is present between the bothrydia on each side behind the parallel parts of the lamellae. The interlamellar setae are inserted laterally to these interlamellar ridges. The lateral sides of the prodorsum may be granulated in the areas of insertion of legs I, II and III and dorsally to these. The sensillar stalks are short and the heads distended semi-lunally, with short bristles along their outer borders. The anterior margin of the notogaster is less arched than in the genus *Oppia* and short chitinous carinae may be present on the anterior border of the notogaster. [Willman (1931) called these carinae "nach hinten laufende Leisten (Rückenleisten)".] Ten pairs of notogastral setae are present. On the ventral side the posterior borders of the fused epimeral pairs 3-4, are arched posteriorly but do not pass beyond the genital plates. Four or five pairs of genital setae are present. The adanal lyrifissures are situated parallel and adjacent to the lateral margins of the anal field. Species of the genus *Oppiella* are mostly shorter than 350µ.

The genus *Oppiella* is represented in the Orange Free State by only one species, *Oppiella nova* (Oudemans, 1902), which is fairly widespread in the area investigated.

ACKNOWLEDGEMENTS

The author wishes to express his sincerest appreciation to Professor R. van Pletzen, who instigated the investigation and under whose supervision it was carried out. His constant advice and assistance were unfailing. Sincere thanks are also due to the C.S.I.R., for a research grant. The author also appreciates the kind assistance of Dr Jun-ichi Aoki, Dr M. Sellnick, Dr G. L. van Eyndhoven, Dr M. Hammer, Dr K. Tarman and Dr F. Mihelcic, who supplied valuable information.

REFERENCES

- AOKI, J. 1959. Die Moosmilben (Oribatei) aus Süd-japan. *Bull. biogeogr. Soc. Japan* **21**: 1-22.
 ——— 1964. Some oribatid mites (Acarina) from Laysan Island. *Pacif. Insects* **6**: 649-64.
 ——— 1965. Oribatiden (Acarina) Thailand. I. *Nature and Life in Southeast Asia* **4**: 129-93.
 PALOGH, J. 1937. *Oppia Dorni* spec. nov., eine neues Moosmilben-Art aus den Süd-Karpaten. *Zool. Anz.* **119**: 221-23.
 ——— 1958. Oribatides nouvelles de l'Afrique tropicale. *Revue Zool. Bot. afr.* **58**: 1-34.
 ——— 1959a. Oribates (Acari) nouveaux d'Angola et du Congo Belge. (1 ère série). *Publicões cult. Co. Diam. Angola* **48**: 91-108.
 ——— 1959b. Neue Oribatiden aus Ungarn (Acari). *Annls. Univ. Scient. bpest. Rolando Eötvös* **2**: 29-32.
 ——— 1959c. Some oribatid mites from Eastern Africa (Acari: Oribatidae). *Acta zool. hung.* **5**: 13-32.
 ——— 1960. Oribates (Acari) nouveaux de Madagascar (1re série). *Mém. Inst. scient. Madagascar* **14**: 7-37.
 ——— 1961a. Descriptions complémentaires d'Oribates (Acari) d'Angola et du Congo (2ème série). *Publicões cult. Co. Diam. Angola* **52**: 65-74.
 ——— 1961b. Some new Oribatidae from Central-Africa (Acari). *Annls. Univ. Scient. bpest. Rolando Eötvös* **4**: 3-7.
 ——— 1961c. The scientific results of the First Hungarian Zoological Expedition to East Africa. 4. Acarina: Oribatei. *Annls. hist.-nat. Mus. natn. hung.* **53**: 517-24.
 ——— 1961d. Identification keys of world oribatid (Acari) families and genera. *Acta zool. hung.* **7**: 243-344.
 ——— 1962a. LXV.—Acari Oribates. *Annls. Mus. r. Afr. cent. Sér.* **110**: 90-131.
 ——— 1962b. Recherches sur la faune endogée de Madagascar. VII. Oribates (Acarina) nouveaux. II. *Naturaliste malgache* **13**: 121-51.
 ——— 1963a. Identification keys of Holarctic oribatid mites (Acari) Families and genera. *Acta zool. hung.* **9**: 1-60.
 ——— 1963b. Oribates (Acari) nouveaux d'Angola et du Congo (3 ème série). *Publicões cult. Co. Diam. Angola* **68**: 33-48.
 ——— 1965. A synopsis of the world oribatid (Acari) general *Acta Zool. hung.* **11**: 5-99.
 ——— 1966. On some Oribatid Mites from Tchad and East Africa collected by Prof. H. Franz, Vienna. *Opusc. zool. Bpest.* **6**: 69-77.
 BALOGH, J. & J. CSISZÁR. 1963. The zoological results of Gy. Topál's collectings in South Argentina. 5. Oribatei (Acarina). *Annls. hist.-nat. Mus. natn. hung.* **55**: 463-85.
 BALOGH, J. & S. MAHUNKA. 1966. New Oribatids (Acari) from South Africa. *Acta zool. hung.* **12**: 1-23.
 ——— 1967. New Oribatids (Acari) from Vietnam. *Acta zool. hung.* **13**: 39-74.
 BANKS, N. 1960. New Oribatidae from the United States. *Proc. Acad. nat. Sci., Philad.* **58**: 490-500.
 BERLESE, A. 1882-1898. Acari, Myriapoda et Scorpiones hucusque in Italia reperta. Padua.
 ——— 1885. Acarorum systematis specimen. *Bull. Soc. Ent. Ital.* **17**: 121-35.
 ——— 1904. Acari nuovi. Manipulus II. *Redia* **1**: 258-80.
 ——— 1908. Elenco di generi e specie nuovi di Acari. *Redia* **5**: 1-15.
 ——— 1910a. Acari nuovi. Manipulus V. *Redia* **6**: 199-230.
 ——— 1910b. Liste di nuove specie e nuovi generi di Acari. *Redia* **6**: 242-71.
 ——— 1913. Acari nuovi. Manipoli VII-VIII. *Redia* **9**: 77-111.
 ——— 1921. Acari, Myriapoda et Pseudoscorpiones hucusque in Italia reperta (Indica). *Redia* **14**: 77-105.

- BERLESE, A. 1924. Centuria sexta di Acari nuovi. *Redia* **15**: 237-62.
- BUITENDIJK, A. M. 1945. Voorlopige catalogus van de Acari in de collectie Oudemans. *Zoöl. Meded. Leiden* **24**: 281-391.
- CANESTRINI, G. 1885. Prospetto dell'Acarofauna Italiana. Padova.
- CANESTRINI, G. & R. CANESTRINI. 1882. Acari italiani nuovi e poco noti. *Atti Ist. veneto Sci.* **5**: 913-30.
- CANESTRINI, G. & F. FANZAGO. 1877. Intorni agli Acari Italiani. *Atti Ist. veneto Sci.* **5**: 69-208.
- COOREMAN, J. 1941. Notes sur la faune des Hautes-Fagnes en Belgique (1), VI (1re partie). Oribatei (Acariens). *Bull. Mus. r. hist.-nat. Belg.* **17**: 1-12.
- CSISZÁR, J. 1961. New oribatids from Indonesian soils (Acari). *Acta zool. hung.* **7**: 345-66.
- CSISZÁR, J. & M. JELEVA. 1962. Oribatid mites (Acari) from Bulgarian soils. *Acta zool. hung.* **8**: 273-310.
- DALENIUS, P. 1950. The oribatid fauna of South Sweden with remarks concerning its ecology and zoogeography. *Kgl. fysiogr. Sällsk. i Lund. Förhandl.* **20**: 1-19.
- DALENIUS, P. & O. WILSON. 1958. On the soil fauna of the Antarctic and the Sub-Antarctic Islands. The Oribatidae (Acari). *Ark. Zool. Ser. 2*, **11**: 393-425.
- DYRDOWSKA, M. 1929. Diagnose einer neue Oribatide. *Zool. Anz.* **80**: 177-8.
- 1931. Studien über die Oribatidenfauna Polens. *Spraw. Kom. fizyogr., Krakow.* **65**: 121-44.
- ELS. A. J. 1965. Studies on the S.A. Oribatei Inferiores (Acarina). Part I: Description of *Mesoplophora africana* Balogh 1958. *Navors. nas. Mus., Bloemfontein* **2**: 29-32.
- EVANS, G. O. 1952. Terrestrial Acari new to Britain.—I. *Ann. Mag. nat. Hist.* **12**: 33-41.
- 1953. On a collection of Acari from Kilimanjaro (Tanganyika). *Ann. Mag. nat. Hist.* **12**: 258-81.
- 1954. Some new and rare species of Acarina. *Proc. zool. Soc. Lond.* **123**: 793-811.
- EWING, H. E. 1909. The Oribatoidea of Illinois. *Bull. Ill. St. Lab. nat. Hist.* **7**: 337-89.
- 1917. New Acarina. Part II—Descriptions of new species and varieties from Iowa, Missouri, Illinois, Indiana and Ohio. *Bull. Am. Mus. nat. Hist.* **37**: 149-72.
- FORSSLUND, K. 1942. Schwedische Oribatei I. *Ark. Zool.* **34A**: 1-11.
- 1953. Schwedische Oribatei (Acari). II. *Ent. Tidskr.* **74**: 152-57.
- GRANDJEAN, F. 1933. Observations sur les Oribates (4e série). *Bull. Mus. 2e serie* **5**: 215-22.
- 1940. Les poils et les organes sensitifs portés par les pattes et le palpe chez les Oribates. *Bull. Soc. ent. Fr.* **65**: 32-44.
- 1953. Essai de classification des Oribates (Acariens). *Bull. Soc. ent. Fr.* **78**: 421-46.
- HALBERT, J. N. 1923. Notes on Acari, with descriptions of new species. *J. Linn. Soc.* **35**: 363-92.
- HAMMER, M. 1944. Studies on the oribatids and collembolids of Greenland. *Meddr. Gronland* **141**: 1-210.
- 1946. The Zoology of East Greenland. *Meddr. Gronland* **122**: 1-39.
- 1952. Investigations on the microfauna of Northern Canada. Part I. Oribatidae. *Acta arct.* **4**: 51-108.
- 1955. Alaskan oribatids. *Acta arct.* **4**: 51-108.
- 1955. Alaskan oribatids. *Acta arct.* **7**: 1-36.
- 1958. Investigations on the oribatid fauna of the Andes Mountains. I. The Argentine and Bolivia. *Biol. Skr. Dan. Vid. Selsk.* **10**: 1-129.
- 1961a. Investigations of the oribatid fauna of the Andes Mountains. II. Peru. *Biol. Skr. Dan. Vid. Selsk.* **13**: 1-157.
- 1961b. A few new species of oribatids from Southern Italy. *Zool. Anz.* **166**: 113-9.
- 1962a. Investigations on the oribatid fauna of the Andes Mountains. III. Chili. *Biol. Skr. Dan. Vid. Selsk.* **13**: 1-96.
- 1962b. Investigations on the oribatid fauna of the Andes Mountains. IV. Patagonia. *Biol. Skr. Dan. Vid. Selsk.* **13**: 1-37.
- HIGGINS, H. G. & T. A. WOOLLEY. 1966. An unusual new genus of mites from Florida (Acari: Oribatei, Oppiidae). *Fla. Ent.* **49**: 67-70.
- HULL, J. E. 1916a. A November week at Grange-over-sands. III. Acari (Terrestrial).
- 1916b. Terrestrial Acarina of the Tyne Province I. Oribatidae. *Trans. nat. Hist. Soc. Northumb.* **4**: 381-410.
- JACOT, A. P. 1934. Some Hawaiian Oribatidae (Acarina). *Bull. Bernice P. Bishop Mus.* **121**: 1-99.
- 1935-1939. The Geenton mites of Florida. *Fla. Ent.* **21**: 49-57.
- 1937a. Journal of the North American moss-mites. *Jl. N.Y. ent. Soc.* **45**: 353-75.

- JACOT, A. P. 1937b. New Moss-mites, chiefly midwestern, II. *Am. Midl. Nat.* **18**: 237-50.
 ——— 1938. New moss-mites, chiefly midwestern, III. *Am. Midl. Nat.* **19**: 647-57.
 ——— 1940. New oribatid mites from South Africa. *Ann. Natal Mus.* **9**: 391-400.
- KOCH, C. L. 1836-1841. Deutschlands Crustaceen, Myriapoda und Arachniden. Ein Beitrag zur deutschen Fauna. Regensburg 5.
 ——— 1842. Übersicht des Arachnidensystems. Nürnberg, 1837-50, **3**: 1-130.
 ——— 1879. Arachniden aus Siberien und Novaja Semlja. *Kongl. Sv. Vet. Akad. Handl.* **16**: 112-8.
- KUNST, M. 1958. Bulgarische Oribatiden (Acarina) II. *Acta Univ. Carol.* **5**: 13-31.
 ——— 1959. Bulgarische Oribatiden (Acarina) III. *Acta Univ. Carol.* **1**: 51-74.
- LEONARDI, G. & A. BERLESE. 1895. Lettera al chiarissimo Prof. Giovanni Canestrine intorno ad alcune nuove Specie di Acari Italiani raccolte e descritte. *Atti. Accad. scient. veneto-trent.-striana* **2**: 5-11.
- MICHAEL, A. D. 1879. A contribution to the knowledge of British Oribatidae. *Jl. R. Microsc. Soc.* **2**: 225-51.
 ——— 1882. I. Further notes on British Oribatidae. *Jl. R. Microsc. Soc.* **2**: 1-18.
 ——— 1884-1888. British Oribatidae. Vol. I. *Ray. Soc.* **1**: 1-336.
 ——— 1885. New British Oribatidae. *Jl. R. Microsc. Soc.* **2**: 385-97.
 ——— 1887. British Oribatidae. *Ray. Soc.* **2**: 337-657.
 ——— 1890. On a collection of Acarina formed in Algeria. *Proc. zool. Soc. Calcutta*: 414-25.
 ——— 1898. Oribatidae. *Tierreich* **3**: 1-93.
- MIHELIC, F. 1953. Ein Beitrag zur Kenntnis der Bodenfauna Kärntens. *Carinthia II* **143**: 105-14.
 ——— 1955. Neue Milbenarten aus Kärnten. *Zool. Anz.* **155**.
 ——— 1956. Oribatiden Südeuropas V. *Zool. Anz.* **157**: 154-74.
 ——— 1957. Die Oribatiden Zentralspaniens. *Verh. zool.-bot. Ges. Wien* **97**: 14-26.
 ——— 1958. Contribucion al conocimiento de los Oribatidos Higrofilos. *An. Edafol. Fisiol. veg.* **17**: 853-89.
 ——— 1959. Zur Kenntnis der Milben aus Südkärnten und Osttirol. *Zool. Anz.* **162**: 362-71.
 ——— 1963. Beitrag zur Kenntnis der Oribatiden-fauna (Oribatei, Acarina). *Zool. Anz.* **170**: 230-40.
- OUDEMANS, A. C. 1896. List of Dutch Acari Latr., 1st. pt. Oribatei Dug., with synonymical notes and other remarks. *Tijdschr. Ent.* **39**: 53-65.
 ——— 1897. Notes on Acari. *Tijdschr. Ent.* **39**: 175-87.
 ——— 1900. New list of Dutch Acari, 1st. pt. *Tijdschr. Ent.* **43**: 150-71.
 ——— 1917. Notizen Über Acari, 25. Reihe. (Trombidiidae, Oribatidae, Phthiracaridae). *Arch. Naturgesch.* **82**: 1-84.
 ——— 1937. Kritisch historisch oversicht der Acarologie. Band F. Oribatei Dugés X 1833. Leiden, E. J. Brill.
- PAOLI, G. 1908. Monografia del genere *Dameosoma* Berl. e generi affini. *Redia* **5**: 31-91.
- POPP, E. 1960. Neue Oribatiden aus Aegypten (Acarina). *Bull. Soc. ent. Egypte* **44**: 203-21.
- RICHTERS, F. 1908. Die Fauna der Moorsrasen des Gaussbergs und einiger südlicher Inseln. *Dt. Südpol. Exped. Bd. 9, Zool.* **1**: 259-302.
- SCHWEIZER, J. 1922. Beitrag zur Kenntnis der terrestrischen Milbenfauna der Schweiz. *Verh. naturf. Ges. Basel* **33**: 23-112.
 ——— 1956. Die Landmilben des schweizerischen Nationalparkes. 3. Teil: Sarcoptiformes Reuter 1909. *Ergebn. wiss. Unters. schweiz. Natn. Parks* **5**: 215-377.
- SELLNICK, M. 1908. Die Tardigraden und Oribatiden den östpreussischen Moorsrasen. *Schr. phys.-ökon. Ges. Königsb. Pr.* **49**: 317-50.
 ——— 1924. Einige neue südamerikanische *Dameosoma* Arten. (Acar. Orib.). Beiträge aus der Tierkunde, Königsberg **18**.
 ——— 1925. Javanische Oribatiden (Acari). *Treubia* **6**: 459-75.
 ——— 1928. Formenkreis: Hornmilben, Oribatei. *Tierwelt Mitteleur.* **3**: 1-42.
 ——— 1950. Zwei neue Milbenarten aus dem Marchfelde. *Z. angew. Ent.* **32**(2).
 ——— 1957. Eine neue Milbe aus der Namib, Südwestafrika (Acari, Oribatei). *J. ent. Soc. Sth. Afr.* **20**: 250-56.
 ——— 1960a. Formenkreis: Hornmilben, Oribatei. *Tierwelt Mitteleur.* **3**: 43-134.
 ——— 1960b. Acarina from southeastern Polynesia—II (Oribatidae). *Bull. Bernice P. Bishop Mus., Occasional Papers* **22**: 109-52.

- SELLNICK, M. 1961. Eine neue *Oppia*—Art aus Tirol (Acar. Oribat.). *Zentbl. ges. Forstw.* **78**: 174-7.
- SEYD, E. L. 1961. The moss mites of Kinder Scout, Derbyshire (Acari: Oribatei). *J. Linn. Soc.* **44**: 585-91.
- STRENTZKE, K. 1951. Some new Central European moss-mites (Acarina: Oribatei). *Ann. Mag. nat. Hist.* **12**: 719-26.
- 1952. Zur Systematik westgrÖnländischer Oribatiden. *Zool. Anz.* **149**: 89-96.
- 1955. Oribates (Acariens). In "Microfaune du sol de l'ège Groenland", vol. I, Arachnides. *Expéditions Polaires Françaises.* **7**: 14-64.
- TARMAN, K. 1957. The oribatid fauna of Macedonia and Montenegro. *Ixdonia* **3**: 138-54.
- 1958. Beitrag zur Kenntnis der Oribatei-fauna Sloweniens II. *Biol. Vest.* **6**: 80-91.
- 1958*. Zwei neue *Oppia*—Arten aus jugoslawischen Hölen, V rokopiso. Unpublished manuscript.
- THOR, S. 1930. Beiträge zur Kenntnis der invertebraten Fauna von Svalband. *Skr. Svalbard Ishavet* **27**: 1-156.
- 1934. Neue Beiträge zur Kenntnis der invertebraten Fauna von Svalband. *Zool. Anz.* **107**: 114-39.
- 1937. Übersicht der norwegischen Cryptostigmata mit einzelnen Nebenbemerkungen. *Nytt. Mag. Naturvid.* **77**: 275-307.
- TRÄGARDH, I. 1904. Monographie de arktischen Acariden. *Fauna arct.* **3**: 1-78.
- 1912. Biospeologica XXII. Acari (First series). *Archs. Zool. exp. gén.* **5**: 519-620.
- (Date?). Acarina from the Juan Fernandez Islands. In "The natural history of the Juan Fernandez and Easter Island", vol. III, edited by Dr Carl Skottsberg.
- VAN DER HAMMEN, L. 1952. The Oribatei (Acari) of the Netherlands. *Zool. Verh. Leiden* **17**: 1-139.
- VAN PLETZEN, R. 1963a. Studies on the South African Oribatei (Acarina). II: Plateremaeidae Trägårdh 1931; Genus: *Pedrocortesella* Hammer, 1961. *Acarologia* **5**: 438-42.
- 1963b. Studies on the South African Oribatei (Acarina). *Acarologia* **5**: 690-703.
- 1965. Studies on the South African Oribatei (Acarina). III. Further new species of the genus *Scheloribates* Berlese, 1908. *Acarologia* **7**: 113-20.
- WALLWORK, J. A. 1961a. Some Oribatei from Ghana. VI. Some members of the "family" Eremaeidae Willmann 1931 (1st series). *Acarologia* **3**: 344-62.
- 1961b. Some Oribatei from Ghana. VII. Members of the "family" Eremaeidae Willmann (2nd series). The genus *Oppia* Koch. *Acarologia* **3**: 637-58.
- 1962. Notes on the taxonomy and distribution of oribatid mites (Acari: Oribatei) from Ghana. *Ann. Mag. nat. Hist.* **13**: 673-81.
- 1963. The Oribatei (Acari) of the Macquarie Island. *Pacif. Insects* **5**: 721-69.
- 1964a. Insects of Campbell Island. Cryptostigmata (Oribatei): Oppiidae. *Pacif. Insects* **7**: 138-47.
- 1964b. Some Oribatei (Acari: Cryptostigmata) from Tchad (1st series). *Rev. Zool. Bot. afr.* **70**: 353-85.
- WARBURTON, C. 1912-1913. The Acarina of Seychelles. *Trans. Linn. Soc. Lond.* **2**: 349-60.
- WILLMANN, C. 1919. Diagnosen einige neuen Oribatiden aus der Umgegend Bremens. *Abh. naturw. Ver. Bremen* **24**: 552-54.
- 1923. Oribatiden aus Quellmoosen. *Arch. Hydrobiol.* **24**: 470-77.
- 1929. Neue Oribatiden II. *Zool. Anz.* **80**: 43-6.
- 1931. Moosmilben oder Oribatiden. F. Dahl. *Tierwelt Dtl.* **22**: 79-199.
- 1932. Oribatei (Acarina), gesammelt von der Deutschen Limnologischen Sunda- Expedition. *Arch. Hydrobiol. Suppl.* **9** ("Tropische Binnengewässer"): 240-305.
- 1933. Acari aus dem Moosebruch. *Z. Morph. Ökol. Tiere* **27**(2).
- 1951. Untersuchungen über die terrestrische Milbenfauna im pannonischen Klimagebiet Österreichs. *Sber. öst. Akad. Wiss.* **160**: 91-176.
- WINKLER, J. R. 1956. New or little known oribatid mites (Acari) in Czechoslovakia. *Cas. národ. Mus.* **125**: 180-5.
- 1957. Chapters on classification of oribatid mites of Czechoslovakia, I-IV. (Acari: Oribatoidea). *Sb. faun. Pract. ent. Odd. nar. Mus. Praha* **2**: 115-30.
- WOOLLEY, T. A. 1957a. Redescriptions of Ewings oribatid mites, III—family Eremaeidae (Acarina: Oribatei). *Ent. News* **68**: 147-56.
- 1957b. Redescriptions of Ewings oribatid mites, V—families Belbidae and Oppiidae (Acarina: Oribatei). *Ent. News* **68**: 211-21.

Manuscript received January 6, 1967

*Not seen in the original.